

REMEDIAL ACTION REPORT

NOVEMBER 1998

Prepared For:

**WITCO CORPORATION
Perth Amboy, New Jersey**

Volume II of VI

Prepared By:

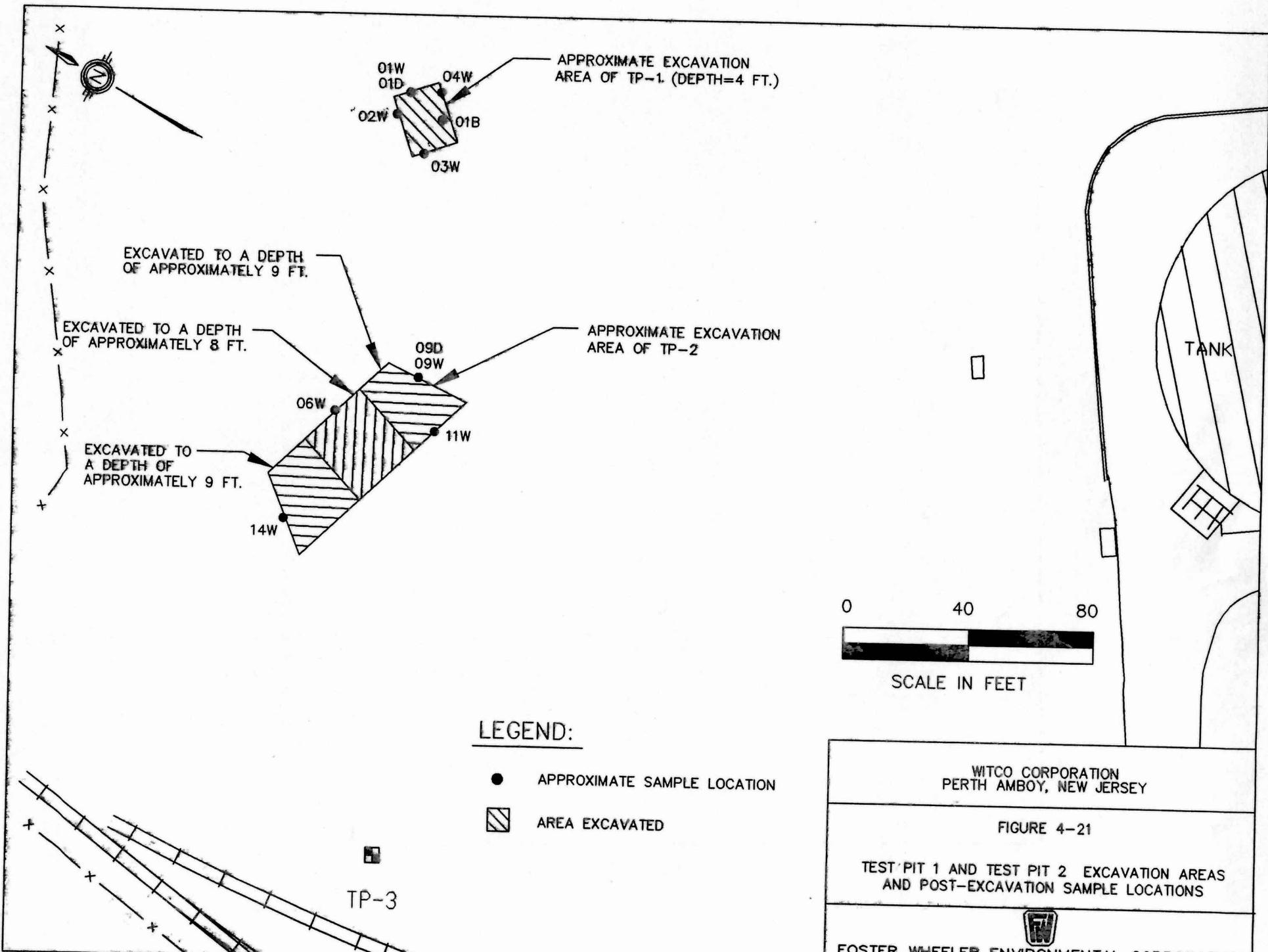


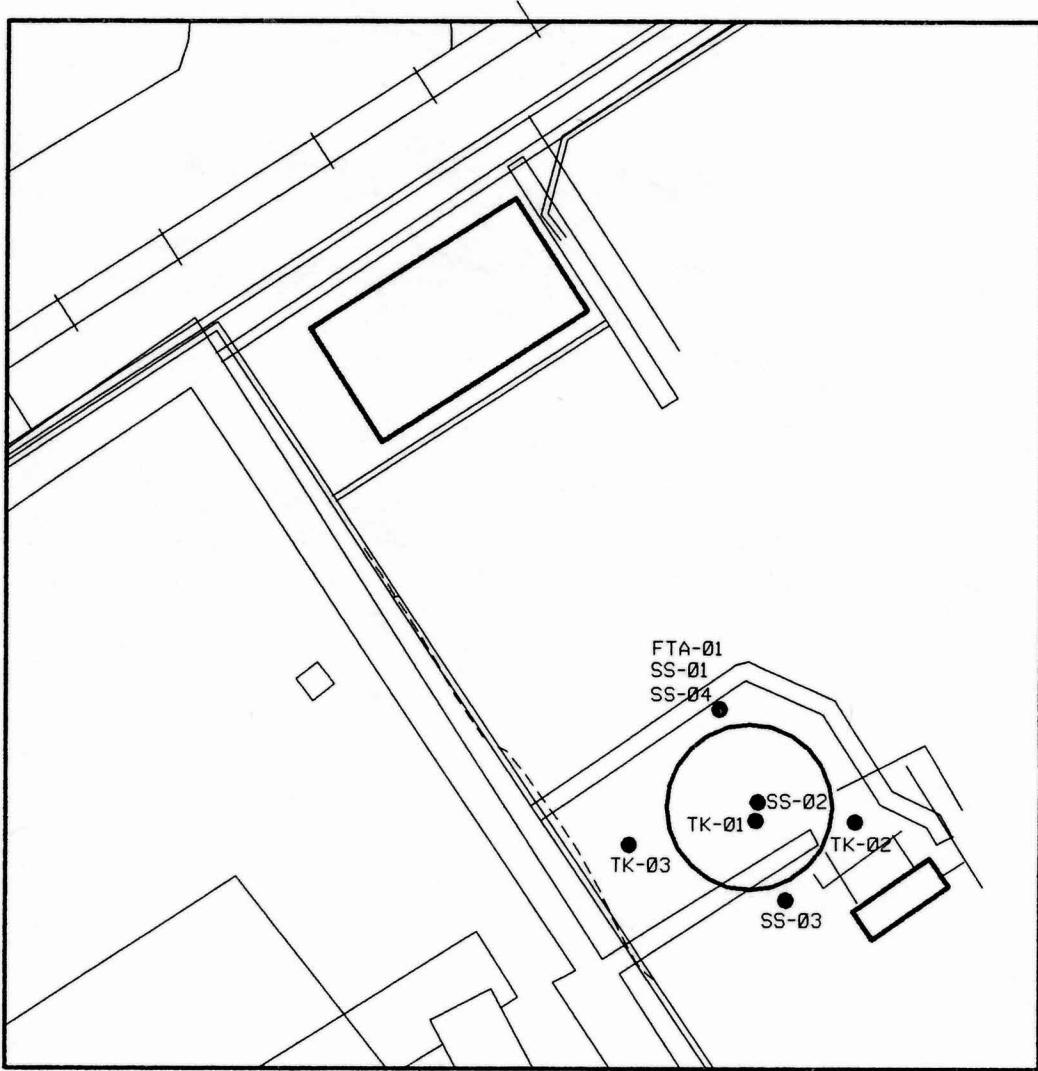
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FIGURES 4-15 THROUGH 4-19

FIGURES 4-15 THROUGH 4-19 CORRESPOND TO THE "POST-CONSTRUCTION RESTORATION / FINAL GRADING PLANS" AS-BUILT DRAWINGS DATED 11/27/96 PROVIDED BY WITCO CORPORATION:

FIGURE 4-15	R95111-D1B
FIGURE 4-16	R95111-D2B
FIGURE 4-17	R95111-D3B
FIGURE 4-18	R95111-D4B
FIGURE 4-19	R95111-D5B





DRAWING NOT TO SCALE

THIS DRAWING PRODUCED ON AUTOCAD
DO NOT REVISE IT MANUALLY

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FIGURE 4-20

FUEL TANK AREA
APPROXIMATE SAMPLE LOCATIONS



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5.0 GROUNDWATER QUALITY

This section presents information on groundwater quality conditions underlying the Perth Amboy Facility. The section consists of a brief discussion of previous investigations and a more detailed subsection on the data from the current groundwater monitoring program. The LMS RI/FS Report (1991) contains substantial information regarding historical groundwater quality data. Table 5-1 presents 12 site-specific groundwater quality standards (SSGWQS) for certain organic compounds. These standards were agreed upon by the joint NJDEP/Witco Committee. The table also compares the SSGWQS with current standards found in the NJDEP Ground Water Quality Standards (GWQS), N.J.A.C. 7:9-6. As can be seen from the table, seven of the SSGWQS are more restrictive than current GWQS criteria. Witco may wish to open discussion with the NJDEP, at a later time, regarding applying current GWQS criteria to the site for these seven compounds. The remainder of the standards used to compare groundwater sample results were taken from the GWQS. A brief subsection on surface water sampling results is also included in the current monitoring program section.

5.1 Existing Monitoring Well Network

There are currently 28 monitoring wells at the Facility. These wells were installed by LMS during the two phases of the RI/FS. These wells are screened in perched water (P), in the shallow water table aquifer (S) which exists in the Woodbridge Member, and in the deep sand aquifer (D or F) which is in the Farrington Member. The Woodbridge Member overlies the Farrington Member, and both are part of the Raritan Formation. Section 2.1.3 describes the site geology and the relationship among the various stratigraphic units. Table 5-2 lists the wells on-site and in which water-bearing zone the well is screened. Figure 5-1 shows the locations of these wells. Figure 2-3 in Section 2.0 shows the groundwater elevations for the Facility during June 1997 and June 1998.

5.2 Previous Investigations

Investigation of the groundwater at the Facility was initiated in 1984. Princeton Aqua Science (PAS) installed seven monitoring wells in the vicinity of the hot oil heater area in March 1984. Three of these wells were screened in the shallow, near surface silty clay layer and four wells were screened in the Woodbridge Member (LMS 1991). Roux Associates Inc. (Roux) generated a report in July 1984, interpreting geologic and water level data acquired by PAS.

Groundwater samples were collected from the seven heater area wells in May and September of 1984. Collected samples were analyzed for VOCs and PCBs. Six of the seven monitoring wells (PAS-1S, PAS-2D, PAS-3D, PAS-3S, PAS-4D and PAS-5D) exhibited low level concentrations of several volatile organics, specifically toluene, benzene, 1,1-dichloroethylene, and 1,2-dichloroethane. One monitoring well, PAS-5S had elevated concentrations of a suite of volatile organics, primarily 1,1-dichloroethylene, 1,1-dichloroethane, dichlorodifluoromethane and vinyl chloride, all of which were detected at concentrations of 200 ug/l or greater. Only one well, PAS-3S, was found to have detectable concentrations of PCBs. In May 1984, the Total PCB concentration of the sample collected for PAS-3S was below 1 ug/l. In September 1984, three

samples collected from the well (a sample and two duplicates) produced Total PCB results of less than 1 ug/l, 1.8 ug/l, and 210 ug/l.

LMS conducted Phase I RI/FS activities in 1986 and 1987, in response to a Stipulation of Settlement entered into by the NJDEP and Witco, and dated September 10, 1985. As part of these activities, 24 monitoring wells were installed and sampled. One round of groundwater samples was collected from the 24 wells in January 1987 and another round was collected from the 24 wells in June 1987. In the January round, six samples out of 26 collected (24 wells plus two duplicates) exhibited Total PCB concentrations in excess of 1 ug/l. The six wells were MW-5D, MW-6S, MW-7P, MW-8P, MW-8S, MW-8D (see Figure 5-1 for locations). The maximum Total PCB concentration detected was 2.9 ug/l from MW-7P. Five of these samples were from wells screened in the Woodbridge Member, while one (MW-5D) was collected from the Farrington (LMS 1991). In the June round, 26 samples were collected once again, with four wells exhibiting detectable concentrations of PCBs. Of the four wells, MW-6S, MW-8P, MW-8S and MW-8D, only MW-6S and MW-8P contained Total PCB concentrations above 1 ug/l.

In 1989, LMS conducted Phase II RI/FS activities. These activities included the installation of five additional deep (Farrington) monitoring wells, the abandonment of one pre-existing well (MW-2S), and the collection of a round of groundwater samples from the newly installed monitoring wells as well as the pre-existing monitoring wells. The five additional deep wells were analyzed for VOCs, BNAs, and PCBs while the remaining wells were analyzed for PCBs only. Groundwater samples from five wells, MW-5D, MW-6S, MW-8P, MW-8S and MW-8D had detectable levels of PCBs, although only MW-8P exhibited a Total PCB result above 1 ug/l.

During the two phases of groundwater sampling (Phase I and II RI/FS), contaminants other than PCBs were also detected at concentrations which exceeded the SSGWQS established by the joint NJDEP/Witco Committee. The other contaminants included VOCs, BNAs and metals. Further discussion of each of these follows.

Five wells, MW-1S, MW-6S, MW-11S, MW-12S and MW-14S (see Figure 5-1 for locations), contained concentrations of VOCs in excess of SSGWQS and/or GWQS. Well MW-1S contained the highest total VOCs concentration, which consisted of TCE; 1,1-DCE and trans-1,2-DCE. The TCE concentration of 1,510 ug/l comprised the majority of the total VOCs concentration recorded. Wells MW-6S, MW-12S and MW-14S all exceeded the 2 ug/l 1,2-DCE GWQS at concentrations of 201 ug/l, 24 ug/l and 86.5 ug/l, respectively. Lastly, MW-11S exceeded both the 1 ug/l benzene GWQS (with a result of 5 ug/l) in the duplicate sample collected from the well (the sample was non-detect for benzene), and the 10 ug/l trans-1,2-DCE SSGWQS (with results of 37.7 ug/l [sample] and 48.8 ug/l[duplicate]).

The only BNA compound to exceed groundwater standards during Phase I and Phase II sampling was bis(2-ethylhexyl)phthalate (SSGWQS 5 ug/l). This compound is a common field and laboratory cross-contaminant. Taking such potential cross-contamination into account, LMS identified only three wells with elevated bis(2-ethylhexyl)phthalate that were potentially site-related. These three wells were MW-2F (140 ug/l), MW-5D (6.8 ug/l/42.9 ug/l) and MW10S (39.8 ug/l).

The two metals LMS identified at elevated concentrations in unfiltered groundwater samples were lead and chromium. Lead concentrations exceeded GWQS in 11 wells and ranged from 100 ug/l in MW-4S, MW-6S, MW-7S and MW-14S to 630 ug/l in MW-11S with an average lead concentration of 235 ug/l. LMS reported that total chromium was detected at elevated concentrations in 14 monitoring wells.

LMS conducted additional groundwater sampling in April 1991, to assess the lead and chromium contamination in groundwater. Results from this sampling indicated that the lead and chromium detected were primarily associated with the suspended solids in the samples. Therefore metals were not considered a concern in site groundwater.

5.3 Current Monitoring Program

Groundwater is currently sampled semi-annually at the Facility in January and June. Groundwater samples are collected for PCB analysis in the January round. In the June round, wells are sampled for VOCs, BNAs, PCBs, TPH, total metals and dissolved metals. Four years, or eight rounds of PCB (from 12/94 through 6/98) and four rounds of VOCs, BNAs, TPH, total metals and dissolved metals groundwater data are available for the site, and are presented in the following section, which is broken down by analytical category.

The PCB soil remediation, drum removal activities and other remedial actions have been conducted at the Facility during the last four years, during the groundwater monitoring program implementation. These source removal activities appear to have had a beneficial impact on concentrations of certain constituents in the groundwater. Potential impacts are described within the following subsections.

VOCs

Five wells, MW-1S, MW-6S, MW-7P (Duplicate), MW-11S and MW-14P, have contained VOCs in concentrations above GWQS in at least one round over the last four years of sampling. All of these are shallow wells screened in either perched water (MW-7P and MW-14P) or the upper part of the Woodbridge Member (MW-1S, MW-6S, and MW-11S). Table 5-3 summarizes the VOC data for the last four years. Figure 5-2 shows the location of these wells as well as the exceeding concentrations of the individual VOCs. Methylene chloride was detected in the duplicate of MW-7P but not in the sample itself. This may indicate intralaboratory contamination, and therefore MW-7P will not be addressed below. Further discussion of each of the remaining wells is presented below.

Chlorinated solvents, specifically TCE and its associated breakdown products; 1,1-DCE and cis-1,2-DCE have been found in MW-1S, in excess of GWQS, in all four years of sampling. In the June 1998 round; 1,1-DCE was detected at 10 ug/l (GWQS 2 ug/l); cis-1,2-DCE was detected at 11 ug/l (GWQS 10 ug/l); and TCE was detected at 280 ug/l (GWQS 1 ug/l). Figures 5-3 and 5-4 graphically show the trends associated with the compounds found in this well. As can be seen from the figures, all three compounds (and therefore the total VOCs) show decreasing trends. Of particular interest is the decrease in the TCE concentration in the well. In June 1995, the TCE

concentration was 940 ug/l while in June 1998 the concentration had dropped to 280 ug/l, which is a 70 percent reduction.

Four VOCs have been found in monitoring well MW-6S in excess of GWQS at least once, in the four years of sampling. The four compounds are chloromethane, methylene chloride, chloroform and benzene. Chloroform was only detected in one round (6/96). This detection (21J ug/l) was above it's GWQS (6 ug/l). Methylene chloride was only detected (36 ug/l) above the GWQS (2 ug/l) once (6/97). Chloromethane was detected in the first three rounds (90J ug/l, 110 ug/l, 52 ug/l) at concentrations above it's GWQS (30 ug/l) but was undetected in the most recent round. Benzene is the only compound that is still present (6.3 ug/l, 6/98) in a concentration above it's GWQS (1 ug/l). Table 5-3 presents the historical sample results. Figures 5-5, 5-6 and 5-7 present the chloromethane, benzene, and total VOCs trends, respectively. All three figures show decreasing trends. During the soil remediation conducted at the Facility, in the latter part of 1995 and the early part of 1996, buried drums were removed from the vicinity of MW-6S (see Section 4.4). The period of drum removal is reflected on the three figures.

Five compounds have been found in samples from MW-11S in concentrations which have exceeded their respective GWQS. The five compounds are methylene chloride, benzene, toluene, ethylbenzene, and xylenes. Methylene chloride was only detected in the first round of sampling, and is probably related to intralaboratory contamination. The remaining four compounds, "BTEX" compounds, have exceeded GWQS in all four rounds (except for benzene in the 6/95 round). Table 5-3 presents the VOCs data for this well. Figures 5-8, 5-9 and 5-10 present the trends for concentrations of benzene, xylene and the combination of toluene, ethylbenzene and naphthalene, respectively, in MW-11S. A soil remediation was conducted adjacent to MW-11S in March 1997 (see Section 4.8). This location was identified as TP-2, where previous sampling had found BTEX and lead concentrations in soil above soil cleanup criteria. The period of soil excavation is reflected on the three figures.

Monitoring well MW-14P samples have exceeded the standard for TCE in the last three rounds of sampling. The exceeding concentrations for these last three rounds have been 1.7 ug/l, 1.8 ug/l and 1.1 ug/l. These results are all just above the 1 ug/l TCE standard. Figure 5-11 shows the decreasing trend for these results as well as the total VOCs for the three rounds.

Base Neutral/Acid Extractable

Only two Base Neutral/Acid Extractable (BNA) compounds, bis(2-ethylhexyl) phthalate and naphthalene, have been detected above SSGWQS or GWQS in the four years of the monitoring program. Table 5-4 presents the BNA sample results, while Figure 5-2 shows the wells where samples exceeded GWQS.

Currently a SSGWQS of 5 ug/l exists for bis(2-ethylhexyl) phthalate. The current GWQS for this compound is 30 ug/l, which is also the practical quantitation level (PQL) for this compound. Since the 5 ug/l SSGWQS is below the PQL, it appears that this is not an appropriate standard. Therefore, the 30 ug/l GWQS will be used for data comparison in this discussion.

Only three samples, from three different wells exceeded the 30 ug/l bis(2-Ethylhexyl) phthalate GWQS in the four years of the program. The three samples that exceeded the 30 ug/l GWQS were from wells MW-3D (38 ug/l in the 6/95 round), MW-6F (32 ug/l in the 6/98 round), and MW-7S (38 ug/l in the 6/98). Samples from well MW-3D have shown a decreasing bis(2-ethylhexyl) phthalate concentration trend (from 38 ug/l in 6/95 to 6.7 ug/l in 6/98). In regard to the two exceeding samples from MW-6F and MW-7S, this most recent round was the first time that samples from these wells exceeded the bis(2-ethylhexyl) phthalate standard. Previous results for samples from both of these wells have been in the 1.8 to 7.4J ug/l range. Another round of samples will help to determine a trend or whether these results could be related to either intralaboratory or field sampling practices.

The SSGWQS which includes naphthalene is 50 ug/l for the combined concentrations of toluene, ethylbenzene and naphthalene (TEN). This standard is stringent for these compounds. The current GWQS for toluene is 1000 ug/l, ethylbenzene is 700 ug/l and naphthalene does not have a standard. Nevertheless based on the 50 ug/l standard, only one well, MW-11S, has exceeded this standard in each of the last four years. Naphthalene detections of 960 ug/l (6/95), 610 ug/l/460 ug/l (6/96), 820 ug/l (6/97) and 290 ug/l (6/98) in MW-11S show a decreasing trend. Figure 5-10 shows the trend for naphthalene concentrations in MW-11S.

As discussed in the VOCs section, a soil remediation was conducted in the vicinity of MW-11S in March 1997. This soil removal appears to have had a positive impact on naphthalene concentrations in MW-11S.

Total Petroleum Hydrocarbons

Total Petroleum Hydrocarbons (TPH) have been detected in four wells, MW-3D, MW-6S, MW-9F and MW-11S, throughout the last four years of the groundwater program. Although there have been TPH detections, during the monitoring program, there is no product present in any Facility monitoring wells. Table 5-4 presents the TPH data for the individual wells.

The two TPH results for MW-3D were 12,500 ug/l (6/96) and 1,100 ug/l (6/98). The 79,000 ug/l result in MW-6S was obtained prior to the excavation of buried drums in the vicinity of this well, which occurred in the winter of 1995/1996. In the rounds following drum removal, the TPH results in MW-6S were 7,100 ug/l (6/96), 14,000 ug/l (6/97) and 5,000 ug/l (6/98). There was one detection of TPH in MW-9F, at a concentration of 520 ug/l, in June 1995. In two subsequent rounds (6/97 and 6/98), TPH was not detected in the well. In June 1995, the TPH result for MW-11S was 870 ug/l. Remedial activities occurred in the vicinity of this well in the latter part of 1995 (test pitting) and in March and April of 1997. The TPH results for this well was 6,800 ug/l in June 1997 and has decreased to 2,600 ug/l in the most recent round (6/98).

Based on the few detections in the most recent round of groundwater samples (6/98) it appears TPH is not a concern in site groundwater.

Pesticides

Low levels of two pesticides, heptachlor and methoxychlor, have been detected in two on-site wells, MW-5D and MW-9S, during the course of the monitoring program. Heptachlor was detected in June 1997 in MW-5D at an estimated concentration of 0.032J ug/l. The GWQS for Heptachlor is 0.4 ug/l. Heptachlor was not detected in MW-5D in the June 1998 round. Methoxychlor was detected in MW-9S at 8 ug/l in June 1997. There is no current standard for methoxychlor. Methoxychlor was not detected in MW-9S in June 1998.

Based on the lack of detections in all site wells in the most recent sampling round (6/98), and only two low level historic detections, well below GWQS, pesticides do not appear to a concern in site groundwater.

PCBs

PCBs have been detected in eight wells on site in the four years of the monitoring program. PCBs are the only compounds analyzed for in both the January and June sampling rounds. Therefore eight rounds of data exist for PCBs. The eight wells in which PCBs were detected in are MW-4S, MW-6S, MW-6F, MW-7P, MW-8P, MW-8S, MW-8D and MW-11S. In all of the above wells the detections exceeded the 1 ug/l SSGWQS for PCBs in at least one round. The exceeding detections of Total PCBs ranged from 1.1 ug/l in MW-8P (6/98) to 13 ug/l in MW-6S (2/96). Table 5-4 presents the PCB results for the individual samples. Only three wells, MW-6S, MW-8P and MW-8D, had multiple detections of Total PCBs above the SSGWQS.

From October 1995 to June 1996, PCB contaminated soil was excavated from various portions of the site. Section 4.2 details the PCB soil remediation. All but one of the detections of Total PCBs in groundwater (1.1 ug/l in MW-8P in June 1998) occurred prior to or during the PCB remediation. It appears the source removal action (the PCB remediation) has positively effected the presence of PCBs in site groundwater. The only well where PCBs are still detected, and detected at a level above the site-specific standard, is MW-8P. The Total PCBs detection of 1.1 ug/l is only 0.1 ug/l above the standard.

The occurrence of PCBs in groundwater will continue to be monitored (through the groundwater monitoring program), although it appears that PCBs are no longer a concern in site groundwater.

Inorganics

Groundwater samples are collected for both total and dissolved inorganics, as part of the monitoring program. Twelve inorganics have exceeded GWQS in the total analyses, in the four years of the monitoring program. The 12 total inorganic analytes are aluminum, antimony, arsenic, barium, cadmium, chromium, iron, lead, manganese, nickel, sodium and zinc. In regard to the dissolved inorganics analysis, eight dissolved analytes have been detected in excess of GWQS. The eight are aluminum, arsenic, barium, cadmium, iron, manganese, nickel and sodium. Discussion of these analytes is presented below. Aluminum, iron, manganese and sodium are typical background constituents. These are found in both the total and dissolved sample analyses,

and are present in upgradient, side-gradient and downgradient wells. They are also found in both the Woodbridge and Farrington wells. This discussion will focus on the remaining inorganics found in site groundwater above GWQS. Inorganic results are compared to GWQS. Table 5-5 presents the total inorganic data while Table 5-6 presents the dissolved inorganic data. Figure 5-12 shows the locations of the wells where collected samples exceeded GWQS (excluding aluminum, iron, manganese and iron).

There has been only one exceedance of the 20 ug/l antimony GWQS in the four rounds of sampling. The exceeding concentration of 20.2 ug/l was detected in total sample from MW-7P in the June 1996 round. The corresponding dissolved sample did not exceed the GWQS. In the following two rounds (June 1997 and June 1998) antimony was not detected and detected at 5.4 ug/l (respectively) in the total sample and undetected in the dissolved samples in both years.

Arsenic has been detected above the GWQS (8 ug/l) in the total metals samples from five wells, MW-3S, MW-5S, MW-6S, MW-10S and MW-11S. Only two wells, MW-6S and MW-11S had dissolved arsenic samples in excess of 8 ug/l. All of these wells are screened within the shallow, water table aquifer. Exceeding total arsenic concentrations ranged from 8.9 ug/l to 93.9 ug/l (see Table 5-5 for individual results), while the dissolved arsenic results ranged from 11.1 ug/l to 61.1 ug/l (see Table 5-6 for individual results). In the most recent round (June 1998) arsenic concentrations, both total and dissolved, in MW-6S were non-detect. The total arsenic concentrations (non-detect for dissolved) for MW-10S have been below the GWQS in the last two rounds (June 1997 and June 1998). The trend for arsenic exceedances for MW-11S for the four rounds has been downward (see Tables 5-5 and 5-6). A drum removal action was performed in the vicinity of MW-6S in 1995 and 1996, and a soil remediation was performed in the vicinity of MW-11S in 1997. These actions appear to have had a positive impact on arsenic concentrations at these locations.

One well, MW-6S, has exceeded the barium GWQS of 2000 ug/l in the last three rounds (6/96, 6/97 and 6/98) of the monitoring program. Both total and dissolved barium has exceeded the GWQS. The total barium concentrations for the three rounds were 5,390 ug/l (6/96), 5,100 ug/l (6/97) and 3,170 ug/l (6/98). The dissolved barium concentrations were 5,600 ug/l (6/96), 4,560 ug/l and 3,310 ug/l during the same period. These are the only barium exceedances in the four rounds of sampling. The concentrations of barium over time for this well exhibit a downward trend that is approaching the GWQS. A drum removal action was performed in the vicinity of MW-6S in late 1995/early 1996.

Total cadmium has been detected above its 4 ug/l GWQS in five wells, MW-5D, MW-6F, MW-13F, MW-14P and MW-15S. Exceeding concentrations have historically ranged from 4.6 ug/l to 12.3 ug/l. In the most recent round (June 1998), total cadmium concentrations were below criterion in MW-13F and MW-15S. Only one well has exhibited dissolved cadmium concentrations in excess of GWQS. Monitoring well MW-14P has produced dissolved cadmium concentrations above 4 ug/l in the last two rounds of sampling (6/97 and 6/98). There is a downward trend associated with the two exceeding results from this well (6.2J ug/l in 6/97 and 4.7 ug/l in 6/98).

Six wells, MW-4S, MW-5S, MW-5D, MW-5F, MW-6S and MW-9F, have contained total chromium concentrations in excess of the 100 ug/l GWQS throughout the course of the monitoring program. Concentrations of total chromium exceedances ranged from 110 ug/l to 730 ug/l. Wells MW-5S, MW-5D, MW-5F, MW-6S and MW-9F each exceeded the standard only once, and in the most recent round (June 1998), none of these exceeded the standard. There were no dissolved chromium results in excess of the 100 ug/l GWQS.

Groundwater samples from 15 wells have had total lead concentrations in excess exceeded the 10 ug/l lead GWQS over the four years of the monitoring program. Exceeding concentrations of total lead ranged from 10.2 ug/l to 250 ug/l. Table 5-5 presents the analytical results and highlights those that have exceeded the standard. In the most recent round, samples from six wells, MW-3D, MW-5D, MW-6F, MW-7S, MW-9S and MW-11S exceeded the lead standard. Lead concentrations for these six samples ranged from 10.2 ug/l to 138 ug/l, with an average of 41 ug/l. There were no wells with dissolved lead concentrations in excess of the lead GWQS.

There have been five wells, MW-4S, MW-4D, MW-5S, MW-5D and MW-5F, which have had total nickel concentrations in excess of the 100 ug/l GWQS for nickel. Total nickel concentrations in excess of the standard range from 106 ug/l to 434J ug/l, with an average of 246 ug/l. In the June 1998 round, only MW-4S exceeded the GWQS for total nickel, with a concentration of 439 ug/l. Monitoring well MW-4S was also the only well which has had exceeding concentrations of dissolved nickel (156 ug/l in 6/97 and 239 ug/l in 6/98).

The 5,000 ug/l zinc GWQS has only been exceeded once during the four years of the monitoring program sampling. A total zinc concentration of 12,000 ug/l was detected in MW-1S in June 1995. The next highest total zinc concentration in the four years of sampling was 595J ug/l. No dissolved zinc concentrations exceeded the GWQS.

Surface Water

Surface water samples are collected annually (during the June round) as part of the monitoring program. Samples are collected at four locations, three along Spa Spring Creek and one near the end of the Amboy Avenue ditch. Spa Spring Creek and the adjacent wetlands are groundwater discharge areas for site groundwater (LMS 1991). Therefore, by monitoring surface water at these locations an approximate assessment can be made as to the impact groundwater has on surface water and what constituents may be migrating off-site. Figure 5-1 shows the locations of these sample points. Table 5-7 presents the Surface Water Quality Standards (SWQS) which were taken from the January 30, 1997 NJDEP letter titled "Surface Water Quality Standards - Criteria Currently Applicable to New Jersey Surface Waters". Surface water samples were/are analyzed for the same parameters as the groundwater samples.

No VOCs, BNAs, TPH or PCBs have been detected above SWQS in the four rounds of sample collection (except for one detection of bis(2-ethylhexyl)phthalate detected in 6/97 in SW-003). Table 5-8 contains the surface water sample results for the organic analyses.

There has been only one exceedance of inorganic surface water standards in the four years of sampling. In the June 1997 round, arsenic was detected in SW-003 at a concentration of 9.6B ug/l (the "B" qualifier indicates the results is below the Method Detection Limit {MDL}) but above the instrument detection limit), which exceeds the 0.017 ug/l standard. In the following round (June 1998), arsenic was not detected in SW-003. Table 5-9 presents the total inorganics sample data for surface water samples. No dissolved metals have been detected above SWQS in the four rounds. Table 5-10 presents the dissolved inorganic data for surface water samples.

Based on the very few detections in surface water samples and overall lack of detections above SWQS, it appears that groundwater is not impacting surface water quality and it also appears that there is no migration of contaminants off-site at this part of the Facility.

5.4 Conclusions

The following conclusions are based upon results obtained during the past four years of groundwater quality monitoring as summarized in Section 5.3. The major soil remediation at the site (see Section 4.0 of this report) involved large portions of the site. The concentrations of contaminants in groundwater appear to have been impacted by the soil and drum removal actions conducted on portions of the site. The time frame of the soil remediation is indicated on Figures 5-4 through 5-11 to show the change in groundwater contaminant concentrations over time and the apparent response to source removal activities.

VOCs

Volatile organic compound groundwater contamination is limited to the perched water and shallow water table aquifer at the Facility. There appear to be four separate localized areas where VOC concentrations exceeded standards. The localized areas of exceedance at MW-1S and MW-14P are comprised of chlorinated solvents. The localized areas of exceedance at MW-6S is comprised of benzene and the localized area of exceedance at MW-11S consists of BTEX. Decreasing trends in contaminant concentrations are apparent at all four locations, as shown by Figures 5-4 through 5-11. Soil remediation activities occurred in the vicinities of MW-1S, MW-6S and MW-11S during the periods indicated on the figures. Recommendations regarding VOCs in groundwater are presented in Section 8.0.

BNAs

Base Neutral/Acid Extractables have been detected in four wells above GWQS (Bis(2-ethylhexyl)phthalate) or site-specific standards (naphthalene). Three of these wells, MW-6F, MW-7S and MW-11S had exceedances in the June 1998 round. Bis(2-ethylhexyl)phthalate was found above GWQS in MW-6F and MW-7S at concentrations just above the 30 ug/l standard (32 ug/l and 38 ug/l, respectively). Bis(2-ethylhexyl) phthalate detections may be related to either intralaboratory cross-contamination or field sampling practices.

MW-11S contained naphthalene at 290 ug/l in June 1998. The naphthalene concentration in MW-11S has been steadily declining (see Figure 5-10). This decline appears to be directly related

to a soil remediation which occurred in the vicinity of this well in 1997 (see Section 4.0 and Figure 5-10).

TPH

Total Petroleum Hydrocarbons (TPH) have been detected in four wells, MW-3D, MW-6S, MW-9F and MW-11S, throughout the last four years of groundwater program. In the last round (6/98) there were only three detections of TPH. Based on the most recent round of groundwater samples (6/98), and the fact that product has not been observed in the monitoring wells at the Facility, it appears TPH is not a concern in site groundwater.

Pesticides

Low levels of two pesticides, heptachlor and methoxychlor, have been detected in two on-site wells, MW-5D and MW-9S, during the course of the monitoring program. Pesticides were not detected in any well in the most recent round in June 1998. Based on the lack of detections in all site wells in the most recent sampling round (6/98), and only two low level historic detections, pesticides do not appear to a concern in site groundwater.

PCBs

Concentrations of Total PCBs above the 1 ug/l site-specific standard is limited to one well on site, based on the last round of data. It appears the source removal action (the PCBs soils remediation), which occurred from October 1995 to June 1996, has successfully removed PCB contaminated soil from the site that may have been impacting site groundwater. Based on the trends of Total PCBs in groundwater, PCBs in groundwater appear to no longer be a concern.

Inorganics

Twelve total inorganic analytes and eight dissolved inorganic analytes have been detected above GWQS during the four years of the monitoring program. Four of the inorganic analytes that have exceeded GWQS for both total and dissolved, aluminum, iron, manganese and sodium are most likely background related, and are not considered a concern in groundwater at the Facility. Of the remaining eight total inorganic analytes that have exceeded GWQS, two, antimony and zinc, were only detected once (antimony in 6/96 and zinc in 6/95). These two detections appear to be anomalous data, based on the one time occurrence, the lack of similar detections in surrounding wells and no exceedances in the dissolved analyses. Both of these inorganics appear not to be of concern in groundwater at the Facility.

Chromium has only exceeded the 100 ug/l in the total analysis. In the most recent round (6/98) only one well, MW-4S, exceeded the chromium GWQS. Since only one well exceeded the standard, and only for total chromium it appears chromium is not a concern in the Facility's groundwater. Concentrations of dissolved lead have not exceeded the lead GWQS in the four years of sampling. Therefore, the detections of lead in excess of standards for the total lead analysis is related to the suspended particulate matter in the sample. Based on the lack of lead concentrations in excess of GWQS in the dissolved lead analysis, it appears that lead is not a

concern in the Facility's groundwater. There were no dissolved arsenic concentrations in excess of GWQS in the most recent round. Based on the lack of arsenic detection above GWQS it appears arsenic is not a concern in the Facility's groundwater.

The remaining three inorganics, barium, cadmium and nickel have exceeded GWQS in both the total and dissolved analyses, have exceeded the GWQS more than once and have exceeded standards in the most recent round. These inorganic analytes are found in isolated areas of exceedance. Barium is found in concentrations above it's GWQS in only one well, MW-6S. Barium concentrations, both total and dissolved, in MW-6S have been decreasing for three years. The total barium concentration in 6/96 were 5,390 ug/l or 2.7 times greater than the standard. In the most recent round the total barium results was 3,170 ug/l or 1.5 times greater than the standard. Buried drums were removed from an area adjacent to MW-6S in late 1995 and early 1996. The drum removal effort appears to have impacted the barium concentrations in MW-6S. Based on the decreasing concentrations of barium in MW-6S it appears barium is not a concern in the Facility's groundwater.

Only one well, MW-14P, contained dissolved cadmium in excess of GWQS in the most recent round. This result of 4.7 ug/l is only 0.7 ug/l above the standard. Based on only one dissolved cadmium result at a concentration of only 0.7 ug/l above the standard it appears cadmium is not a concern in the Facility's groundwater.

In the most recent round only one well, MW-4S, exceeded the 100 ug/l nickel GWQS. The dissolved result was only 2.4 times the standard. Nickel does not appear to be a concern in the Facility's groundwater based on only one detection, only 2.4 times the standard.

Based on the observed downward trends for inorganic contamination in a number of monitoring wells, most of the exceedances only slightly above GWQS, and the occurrence of most inorganic contaminants in the suspended solids in the groundwater samples (based on the comparison between total vs. dissolved data) it appears that inorganics are not a concern in the Facility's groundwater.

TABLE 5-1
WITCO CORPORATION
PERTH AMBOY, NEW JERSEY
SITE-SPECIFIC GROUNDWATER QUALITY STANDARDS
COMPARED TO N.J.A.C. 7:9-6 STANDARDS
(in ug/l)

COMPOUND	SITE-SPECIFIC STANDARDS	N.J.A.C. 7:9-6 STANDARDS
1,1,2-Trichloroethane	5	30
1,1-Dichloroethylene	2	2
1,2-Dichloroethane	2	2
Benzene	1	1
Trichloroethylene	1	1
Ethylbenzene	(a)	700
Toluene	(a)	1000
trans-1,2-Dichloroethylene	10	100
Benzo(b)fluoranthene	5	NC*
Bis (2-ethylhexyl)phthalate	5	30
Naphthalene	(a)	NC
PCBs	1	0.5

NOTE:

(a) The sum of the components denoted shall not exceed 50 ug/L.

* The Practical Quantification Limit for this compound is 10 ug/l

TABLE 5-2
WITCO CORPORATION
PERTH AMBOY FACILITY
MONITORING WELLS ON-SITE

38
155
67
54

WELL NO.	SCREENED INTERVAL (ft) ^a	SCREENED FORMATION
MW-1S	21-31	Woodbridge
MW-2S	3-13	Woodbridge
MW-2D	40.45	Farrington
MW-2F	52-62	Farrington
MW-3S	7.7-17.7	Woodbridge
MW-3D	34.6-44.6	Farrington
MW-4S	11-21	Woodbridge
MW-4D	36-41	Farrington
MW-5S	10-20	Woodbridge
MW-5D	39.3-44.3	Farrington
MW-5F	64-74	Farrington
MW-6S	13-23	Woodbridge
MW-6F	70-80	Farrington
MW-7S	20-30	Woodbridge
MW-7P	3-13	Woodbridge
MW-8S	17-27	Woodbridge
MW-8D	32-37	Farrington
MW-8P	3-13	Woodbridge
MW-9S	25-35	Woodbridge
MW-9F	60-70	Farrington
MW-10S	25-35	Woodbridge
MW-11S	3-13	Woodbridge
MW-11D	27-32	Farrington
MW-12S	4-14	Woodbridge
MW-13S	14.6-24.6	Woodbridge
MW-13F	48.5-58.5	Farrington
MW-14S	20-30	Woodbridge
MW-14P	3-13	Woodbridge
MW-15S	25-35	Woodbridge

a - Depth from ground surface on August 14, 1989.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number	Groundwater Quality Standards (NJAC 7:9-6)	MW-1S 6/14/95	MW-1S 6/13/96	MW1S 96-DUP	MW-1S 7/2/97	MW-1S 6/18/98	MW-2D 6/13/95	MW-2D 6/12/96	MW-2D 7/2/97	MW-2D 6/16/98	MW-3S 6/11/96	MW-3S 6/27/97
Sample Date												
Parameter												
VOLATILE ORGANIC COMPOUNDS												
Chloromethane	30	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	U	U	U	U	U	U
Acetone	700	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	16J	12	12	11	10	U	U	U	U	U	U
1,1-Dichloroethane	70	U	8.6	9	7.6	4.6	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	39J*	43	42	28	11	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	940	880	860	640	280	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		940	943.6	923	686.6	305.6	U	U	U	U	U	U
Total VOCs (J's Included)		995	943.6	923	686.6	305.6	U	U	U	U	U	U
Total Estimated TICs		U	U	U	U	U	U	U	U	U	U	U
Total VOCs and TICS		995	943.6	923	686.6	305.6	U	U	U	U	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
 shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number	Groundwater Quality Standards (NJAC 7:9-6)	MW-3S 6/17/98	MW-3D 6/14/95	MW-3D 6/12/96	MW-3D 6/27/97	MW-3D 6/17/98	MW-4S 6/9/95	MW-4S 6/11/96	MW-4S 6/30/97	MW-4S 6/22/98	MW-4D 6/9/95
Parameter											
VOLATILE ORGANIC COMPOUNDS											
Chloromethane	30	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	1.1J	U	U	U	U
Acetone	700	U	U	U	U	U	4.3JB	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	2.1J	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Included)		U	2.1	U	U	U	1.1	U	U	U	U
Total Estimated TICs		U	U	71	U	U	U	U	U	U	U
Total VOCs and TICS		U	2.1	71	U	U	1.1	U	U	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-4D 6/11/96	MW-4D 6/30/97	MW-4D 6/22/98	MW-4D 98-DUP	MW-5S 6/11/96	MW-5S 6/30/97	MW-5S 6/15/98	MW-5S 6/9/95	MW-5D 6/10/96	MW-5D 6/30/97
Parameter											
VOLATILE ORGANIC COMPOUNDS											
Chloromethane	30	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	U	U	U	U	U
Acetone	700	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	1.3	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	U	1.3	U	U	U	U	U
Total VOCs (J's Included)		U	U	U	U	1.3	U	U	U	U	U
Total Estimated TICs		U	U	U	U	3.5	U	U	32	U	U
Total VOCs and TICS		U	U	U	U	4.8	U	U	32	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
 shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-5D 6/17/98	MW-5F 6/9/95	MW-5F 6/10/96	MW-5F 7/2/97	MW-5F 6/17/98	MW-6S 6/13/95	MW-6S 6/12/96	MW-6S 6/25/97	MW-6S 6/22/98	MW-6F 6/13/95
Parameter											
VOLATILE ORGANIC COMPOUNDS											
Chloromethane	30	U	U	U	U	U	90J	110J	52	U	U
Methylene Chloride	2	U	U	U	U	U	200B	U	36	1.4	U
Acetone	700	U	11JB	U	U	U	1600B	U	280	62	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	21J	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	16	14	6.3	U
Toluene	(a)	U	U	U	U	U	U	18	13	3.8	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	19	0.9	U
Styrene	100	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	52	U	9.5	U
Total VOCs (J's Excluded)		U	U	U	U	U	U	86	414	83.9	U
Total VOCs (J's Included)		U	U	U	U	U	90	217	414	83.9	U
Total Estimated TICs		9.3	1	U	U	U	8840	2940	1710	166	U
Total VOCs and TICS		9.3	1	U	U	U	8930	3157	2124	249.9	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
 shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
WITCO CORPORATION
PERTH AMBOY, NEW JERSEY
TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
JUNE 1995 - JUNE 1998

Sample Number	Groundwater Quality Standards (NJAC 7:9-6)	MW-6F 6/30/97	MW-6F 6/22/98	MW-7P 6/8/95	MW-7P 95-DUP	MW-7P 6/12/96	MW-7P 6/25/97	MW-7P 6/19/98	MW-7S 6/12/96	MW-7S 6/26/97	MW-7S 6/19/98	MW-8P 6/13/96
Parameter												
VOLATILE ORGANIC COMPOUNDS												
Chloromethane	30	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	4.5J	U	U	U	U	U	U	U
Acetone	700	U	U	U	5.1J	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Included)		U	U	U	9.6	U	U	U	U	U	U	U
Total Estimated TICs		U	U	U	U	U	U	U	5.1	U	U	U
Total VOCs and TICS		U	U	U	9.6	U	U	U	5.1	U	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number	Groundwater Quality Standards (NJAC 7:9-6)	MW-8P	MW-8P	MW-8S	MW-8S	MW-8S	MW-8D	MW-8D	MW-8D	MW-8D	MW-9S	MW-9S
Sample Date		6/27/97	6/23/98	6/13/96	6/27/97	6/23/98	6/12/95	6/13/96	6/27/97	6/23/98	6/13/95	6/14/96
Parameter												
VOLATILE ORGANIC COMPOUNDS												
Chloromethane	30	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	U	U	U	U	1.5JB	U
Acetone	700	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	0.4	0.8	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	0.4	0.8	U	U	U	U	U	U
Total VOCs (J's Included)		U	U	U	0.4	0.8	U	U	U	U	U	U
Total Estimated TICs		U	U	U	U	U	5	U	U	U	U	U
Total VOCs and TICS		U	U	U	0.4	0.8	5	U	U	U	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-9S 6/26/97	MW-9S 6/19/98	MW-9F 6/8/95	MW-9F 6/13/96	MW-9F 7/2/97	MW-9F 98-DUP	MW-9F 6/18/98	MW-10S 6/13/95	MW-10S 6/14/96	MW-10S 6/26/97
Parameter											
VOLATILE ORGANIC COMPOUNDS											
Chloromethane	30	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	U	U	U	U	U
Acetone	700	U	U	U	U	U	U	U	8.9JB	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	U	U	U	U	U	U	U
Total VOCs (J's Included)		U	U	U	U	U	U	U	U	U	U
Total Estimated TICs		U	U	U	U	U	U	U	U	U	U
Total VOCs and TICS		U	U	U	U	U	U	U	U	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-10S 6/16/98	MW-11S 6/8/95	MW-11S 6/17/96	MW-11S 96-DUP	MW-11S 6/25/97	MW-11S 6/22/98	MW-11D 6/8/95	MW-11D 6/17/96	MW-11D 6/25/97
Parameter										
VOLATILE ORGANIC COMPOUNDS										
Chloromethane	30	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	210J	U	U	U	U	U	U	U
Acetone	700	U	U	U	U	U	89	6.6J	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	26	18	17	15	U	U	U
Toluene	(a)	U	900	500	340	15	240	U	U	U
Ethylbenzene	(a)	U	1400	1600	1100	1200	610	U	U	U
Styrene	100	U	U	80	54	U	U	U	U	U
Xylene (Total)	100	U	7100	7700	5300	3300	3500	U	U	U
Total VOCs (J's Excluded)		U	9400	9906	6812	4532	4454	U	U	U
Total VOCs (J's Included)		U	9610	9906	6812	4532	4454	6.6	U	U
Total Estimated TICs		U	740	7050	4460	6940	5210	U	U	U
Total VOCs and TICs		U	10350	16956	11272	11472	9664	6.6	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
 shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-11D 97-DUP	MW-11D 6/22/98	MW-12S 6/14/95	MW-12S 6/17/96	MW-12S 6/24/97	MW-12S 6/18/98	MW-13S 6/14/95	MW-13S 6/18/96	MW-13S 7/1/97
Parameter										
VOLATILE ORGANIC COMPOUNDS										
Chloromethane	30	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	U	1J	U	U
Acetone	700	U	U	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U	U	U
Ethylbenzene	(a)	0.3	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		0.3	U	U	U	U	U	U	U	U
Total VOCs (J's Included)		0.3	U	U	U	U	U	1	U	U
Total Estimated TICs		U	U	U	U	U	U	U	U	U
Total VOCs and TICS		0.3	U	U	U	U	U	1	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-13S 6/16/98	MW-13F 6/14/95	MW-13F 6/19/96	MW-13F 7/1/97	MW-13F 97-DUP	MW-13F 6/18/98	MW-14P 6/18/96	MW-14P 7/1/97	MW-14P 6/16/98
Parameter										
VOLATILE ORGANIC COMPOUNDS										
Chloromethane	30	U	U	U	U	U	U	U	U	U
Methylene Chloride	2	U	U	U	U	U	U	U	U	U
Acetone	700	U	U	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U	0.4	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U	0.3	U
Trichloroethene	1	U	U	U	U	U	U	1.7	1.8	1.1
Benzene	1	U	U	U	U	U	U	0.3	U	U
Toluene	(a)	U	U	U	U	U	U	0.6	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	U	U	U	2.6	2.5	1.1
Total VOCs (J's Included)		U	U	U	U	U	U	2.6	2.5	1.1
Total Estimated TICs		U	U	U	U	U	U	U	U	U
Total VOCs and TICS		U	U	U	U	U	U	2.6	2.5	1.1

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
 shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-3
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TCL VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

Sample Number Sample Date	Groundwater Quality Standards (NJAC 7:9-6)	MW-14S 6/14/95	MW-14S 6/18/96	MW-14S 7/1/97	MW-14S 6/16/98	MW-15S 6/18/96	MW-15S 7/1/97	MW-15S 6/17/98
Parameter								
VOLATILE ORGANIC COMPOUNDS								
Chloromethane	30	U	U	U	U	U	U	U
Methylene Chloride	2	1.1J	U	U	U	U	U	U
Acetone	700	U	U	U	U	U	U	U
Carbon Disulfide	NC	U	U	U	U	U	U	U
1,1-Dichloroethene	2	U	U	U	U	U	U	U
1,1-Dichloroethane	70	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	10	U	U	U	U	U	U	U
Chloroform	6	U	U	U	U	U	U	U
1,1,1-Trichloroethane	30	U	U	U	U	U	U	U
Trichloroethene	1	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U
Toluene	(a)	U	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U
Xylene (Total)	100	U	U	U	U	U	U	U
Total VOCs (J's Excluded)		U	U	U	U	U	U	U
Total VOCs (J's Included)		1.1	U	U	U	U	U	U
Total Estimated TICs		U	U	U	U	U	U	U
Total VOCs and TICS		1.1	U	U	U	U	U	U

All concentrations are in micrograms per liter (µg/L).

U - not detected

J - estimated

(a) the sum of Toluene, Ethylbenzene, & Naphthalene
shall not exceed 50 µg/L.

B - analyte detected in laboratory method blank

NC - No Criteria

* - Includes total 1,2-Dichloroethene

Shading indicates concentration exceeds NJ Standard.

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-1S 12/7/94	MW-1S 6/14/95	MW-1S 2/1/96	MW-1S 6/13/96	MW-1S 96-DUP	MW-1S Jan-97	MW-1S 7/2/97	MW-1S Jan-98	MW-1S 6/18/98	MW-1S Jan-96	MW-2S 2/1/96	MW-2S Jun-96	MW-2S Jan-97	MW-2S Jun-97	MW-2S Jan-98
Sample Date																
Parameter																
TCL Base/ Neutral & Acid Extractable Organic Compounds																
Phenol	4000	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Naphthalene	a	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Pyrene	200	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Butylbenzylphthalate	100	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Benzo(a)anthracene	NC	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Chrysene	NC	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
bis(2-Ethylhexyl)phthalate	5	NR	1.3J	NA	1.5	U	NR	1.6J	NR	1.9	NR	NA	NS	NR	NS	NR
Benzo(a)pyrene	NC	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Benzo(g,h,i)perylene	NC	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Benzo(b)fluoranthene	5	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
4-Methylphenol	NC	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
2-Methylnaphthalene	NC	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Total Semi-VOCs (Js excluded)	.	NR	U	NA	1.5	U	NR	U	NR	1.9	NR	NA	NS	NR	NS	NR
Total Semi-VOCs (Js included)		NR	1.3	NA	1.5	U	NR	1.6	NR	1.9	NR	NA	NS	NR	NS	NR
TICs (estimated)		NR	50	NA	55	60	NR	86	NR	94	NR	NA	NS	NR	NS	NR
Total Semi-VOCs (Js and TICs included)		NR	51.3	NA	56.5	60	NR	87.6	NR	95.9	NR	NA	NS	NR	NS	NR
Total Petroleum Hydrocarbons (TPH)																
TPH	NN	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Polychlorinated Biphenyls (PCBs)																
Total PCBs	1	U	U	U	U	U	U	U	U	U	U	UJ	UJ	NS	NS	NS
Organochlorine Pesticides																
Heptachlor	0.4	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR
Methoxychlor	40	NR	U	NA	U	U	NR	U	NR	U	NR	NA	NS	NR	NS	NR

U - Not detected.

J - Estimated.

R - Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS - not sampled

NA - not analyzed

NC - no criteria

NR - not required

1-N.J.A.C. 7:9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
WITCO CORPORATION
PERTH AMBOY, N. J.
TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-2S	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2F	MW-3D	MW-3D	MW-3D	MW-3D	
Sample Date		Jun-98	12/1/94	6/13/95	1/26/96	6/12/96	Jan-97	7/2/97	Jan-98	6/16/98	12/1/94	11/30/94	3/13/95	6/14/95	1/25/96	96-DUP
Parameter																
TCL Base/ Neutral & Acid Extractable Organic Compounds																
Phenol	4000	NR	NR	3.5J	NR	3.4J	NR	U	NR	U	NR	NR	NR	U	NR	NR
Naphthalene	a	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Pyrene	200	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Butylbenzylphthalate	100	NR	NR	U	NR	U	NR	0.7J	NR	U	NR	NR	NR	U	NR	NR
Benzo(a)anthracene	NC	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Chrysene	NC	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
bis(2-Ethylhexyl)phthalate	5	NR	NR	U	NR	U	NR	1.7J	NR	2	NR	NR	NR	38	NR	NR
Benzo(a)pyrene	NC	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Benzo(g,h,i)perylene	NC	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Benzo(b)fluoranthene	5	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
4-Methylphenol	NC	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
2-Methylnaphthalene	NC	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Total Semi-VOCs (Js excluded)	.	NR	NR	U	NR	U	NR	U	NR	2	NR	NR	NR	38	NR	NR
Total Semi-VOCs (Js included)		NR	NR	3.5	NR	3.4	NR	2.4	NR	2	NR	NR	NR	38	NR	NR
TICs (estimated)		NR	NR	5	NR	U	NR	48	NR	U	NR	NR	NR	229	NR	NR
Total Semi-VOCs (Js and TICs included)		NR	NR	8.5	NR	3.4	NR	50.4	NR	2	NR	NR	NR	267	NR	NR
Total Petroleum Hydrocarbons (TPH)																
TPH	NN	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Polychlorinated Biphenyls (PCBs)																
Total PCBs	1	NS	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Organochlorine Pesticides																
Heptachlor	0.4	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR
Methoxychlor	40	NR	NR	U	NR	U	NR	U	NR	U	NR	NR	NR	U	NR	NR

U - Not detected

J - Estimated

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J A C 7 9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
WITCO CORPORATION
PERTH AMBOY, N. J.

TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)

NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-3D 6/12/96	MW-3D Jan-97	MW-3D 6/27/97	MW-3D Jan-98	MW-3D 6/17/98	MW-3S 12/5/94	MW-3S 6/14/95	MW-3S 1/25/96	MW-3S 6/11/96	MW-3S Jan-97	MW-3S 6/27/97	MW-3S Jan-98	MW-3S 6/17/98	MW-4S 12/2/94	MW-4S 6/9/95
Sample Date																
Parameter																
TCL Base/ Neutral & Acid Extractable Organic Compounds																
Phenol	4000	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Naphthalene	a	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Pyrene	200	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Butylbenzylphthalate	100	U	NR	1.2J	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Benzo(a)anthracene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Chrysene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
bis(2-Ethylhexyl)phthalate	5	27	NR	1.2J	NR	6.7	NR	NA	NR	U	NR	U	NR	U	1.4	NR
Benzo(a)pyrene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Benzo(g,h,i)perylene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Benzo(b)fluoranthene	5	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
4-Methylphenol	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
2-Methylnaphthalene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Total Semi-VOCs (Js excluded)	.	27	NR	U	NR	6.7	NR	NA	NR	U	NR	U	NR	U	1.4	NR
Total Semi-VOCs (Js included)		27	NR	2.4	NR	6.7	NR	NA	NR	U	NR	U	NR	U	1.4	NR
TICs (estimated)		433	NR	U	NR	32	NR	NA	NR	U	NR	U	NR	U	26	NR
Total Semi-VOCs (Js and TICs included)		460	NR	2.4	NR	38.7	NR	NA	NR	U	NR	U	NR	U	27.4	NR
Total Petroleum Hydrocarbons (TPH)																
TPH	NN	12,500	NR	U	NR	1,100	NR	NA	NR	U	NR	U	NR	U	NR	U
Polychlorinated Biphenyls (PCBs)																
Total PCBs	1	U	U	U	U	U	U	U	U	U	U	U	U	U	3.1J	U
Organochlorine Pesticides																
Heptachlor	0.4	U	NR	U	NR	U	NR	NA	NR	UJ	NR	U	NR	U	NR	U
Methoxychlor	40	U	NR	U	NR	U	NR	NA	NR	UJ	NR	U	NR	U	NR	U

U - Not detected

J - Estimated

R - Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS - not sampled

NA - not analyzed

NC - no criteria

NR - not required

1-N J A C 7 9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ ($\mu\text{g/L}$)	MW-4S 1/29/96	MW-4S 6/11/96	MW-4S Jan-97	MW-4S 6/30/97	MW-4S Jan-98	MW-4S 6/22/98	MW-4D 12/2/94	MW-4D 6/9/95	MW-4D 1/29/96	MW-4D 6/11/96	MW-4D Jan-97	MW-4D 6/30/97	MW-4D Jan-98	MW-4D 6/22/98	MW-4D 98-DUP	
Sample Date																	
Parameter																	
TCL Base/ Neutral & Acid Extractable Organic Compounds																	
Phenol	4000	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Naphthalene	a	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Pyrene	200	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Butylbenzylphthalate	100	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Benzo(a)anthracene	NC	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Chrysene	NC	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
bis(2-Ethylhexyl)phthalate	5	NR	U	NR	U	NR	15	NR	U	NR	U	NR	U	2.2	NR	10	11
Benzo(a)pyrene	NC	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Benzo(g,h,i)perylene	NC	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Benzo(b)fluoranthene	5	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
4-Methylphenol	NC	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
2-Methylnaphthalene	NC	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Total Semi-VOCs (Js excluded)	.	NR	U	NR	U	NR	15	NR	U	NR	U	NR	U	2.2	NR	10	11
Total Semi-VOCs (Js included)		NR	U	NR	U	NR	15	NR	U	NR	U	NR	U	2.2	NR	10	11
TICs (estimated)		NR	U	NR	U	NR	24	NR	15	NR	U	NR	9.6	NR	8.5	121	
Total Semi-VOCs (Js and TICs included)		NR	U	NR	U	NR	39	NR	15	NR	U	NR	11.8	NR	18.5	132	
Total Petroleum Hydrocarbons (TPH)																	
TPH	NN	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Polychlorinated Biphenyls (PCBs)																	
Total PCBs	1	UJ	U	U	U	U	U	U	U	U	U	U	U	U	U	U	
Organochlorine Pesticides																	
Heptachlor	0.4	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	
Methoxychlor	40	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	U	

U - Not detected

J - Estimated

R - Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 $\mu\text{g/l}$

NN - none noticeable

NS - not sampled

NA - not analyzed

NC - no criteria

NR - not required

1-N J A C 7 9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ ($\mu\text{g/L}$)	MW-5D 11/30/94	MW-5D 6/9/95	MW-5D 1/25/96	MW-5D 6/10/96	MW-5D Jan-97	MW-5D 6/30/97	MW-5D Jan-98	MW-5D 6/17/98	MW-5D 11/30/94	MW-5S 6/13/95	MW-5S 1/25/96	MW-5S 6/11/96	MW-5S Jan-97	MW-5S 6/30/97
Sample Date															
Parameter															
TCL Base/ Neutral & Acid Extractable Organic Compounds															
Phenol	4000	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
Naphthalene	a	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
Pyrene	200	NR	U	NR	1.2	NR	U	NR	U	NR	NA	NR	U	NR	1.5
Butylbenzylphthalate	100	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
Benzo(a)anthracene	NC	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	1.2
Chrysene	NC	NR	U	NR	2.1	NR	U	NR	U	NR	NA	NR	U	NR	2.2
bis(2-Ethylhexyl)phthalate	5	NR	U	NR	20	NR	2.1	NR	19	NR	NA	NR	U	NR	28
Benzo(a)pyrene	NC	NR	U	NR	2.3	NR	U	NR	U	NR	NA	NR	U	NR	1.9
Benzo(g,h,i)perylene	NC	NR	U	NR	2.3	NR	U	NR	U	NR	NA	NR	U	NR	2.3
Benzo(b)fluoranthene	5	NR	U	NR	1	NR	U	NR	U	NR	NA	NR	U	NR	U
4-Methylphenol	NC	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
2-Methylnaphthalene	NC	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
Total Semi-VOCs (Js excluded)	.	NR	U	NR	28.9	NR	2.1	NR	19	NR	NA	NR	U	NR	37.1
Total Semi-VOCs (Js included)	.	NR	U	NR	28.9	NR	2.1	NR	19	NR	NA	NR	U	NR	37.1
TICs (estimated)	.	NR	31	NR	9	NR	47	NR	212	NR	NA	NR	U	NR	25
Total Semi-VOCs (Js and TICs included)	.	NR	31	NR	37.9	NR	49.1	NR	231	NR	NA	NR	U	NR	62.1
Total Petroleum Hydrocarbons (TPH)	NN	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
TPH	NN	NR	U	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	U
Polychlorinated Biphenyls (PCBs)															
Total PCBs	1	U	U	U	UJ	UJ	U	U	U	U	U	U	NS	U	U
Organochlorine Pesticides															
Heptachlor	0.4	NR	U	NR	UJ	NR	0.032J	NR	U	NR	NA	NR	U	NR	U
Methoxychlor	40	NR	U	NR	UJ	NR	U	NR	U	NR	NA	NR	U	NR	U

U - Not detected

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R - Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 $\mu\text{g/l}$

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TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ ($\mu\text{g/L}$)	MW-5S Jan-98	MW-5S 6/15/98	MW-5F 6/9/95	MW-5F 1/25/96	MW-5F 6/10/96	MW-5F Jan-97	MW-5F 7/2/97	MW-5F Jan-98	MW-5F 6/17/98	MW-5F 12/2/94	MW-6S Jan-95	MW-6S 6/13/95	MW-6S 2/1/96	MW-6S 6/12/96	MW-6S Jan-97	
Sample Date																	
Parameter																	
TCL Base/ Neutral & Acid Extractable Organic Compounds																	
Phenol	4000	NR	U	3.4J	NR	2.3	NR	1.4J	NR	U	NR	NR	U	NR	73	NR	
Naphthalene	a	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Pyrene	200	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Butylbenzylphthalate	100	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Benzo(a)anthracene	NC	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Chrysene	NC	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
bis(2-Ethylhexyl)phthalate	5	NR	5.8	U	NR	U	NR	U	NR	2.9	NR	NR	U	NR	U	NR	
Benzo(a)pyrene	NC	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Benzo(g,h,i)perylene	NC	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Benzo(b)fluoranthene	5	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
4-Methylphenol	NC	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
2-Methylnaphthalene	NC	NR	U	U	NR	U	NR	U	NR	U	NR	NR	U	NR	U	NR	
Total Semi-VOCs (Js excluded)	.	NR	5.8	U	NR	2.3	NR	U	NR	2.9	NR	NR	U	NR	73	NR	
Total Semi-VOCs (Js included)		NR	5.8	3.4	NR	2.3	NR	1.4	NR	2.9	NR	NR	U	NR	73	NR	
TICs (estimated)		NR	24	68	NR	13	NR	U	NR	21	NR	NR	49,240	NR	76,749	NR	
Total Semi-VOCs (Js and TICs included)		NR	29.8	71.4	NR	15.3	NR	1.4	NR	23.9	NR	NR	49,240	NR	76,822	NR	
Total Petroleum Hydrocarbons (TPH)		NN	NR	U	U	NR	U	NR	U	NR	U	NR	NR	79,000	NR	7,100	NR
TPH	NN	NR	U	U	NR	U	NR	U	NR	U	NR	NR	NR	79,000	NR	7,100	NR
Polychlorinated Biphenyls (PCBs)																	
Total PCBs	1	U	U	U	U	UJ	U	U	U	U	U	3.5	2.2J	U	13	UJ	2.2J
Organochlorine Pesticides																	
Heptachlor	0.4	NR	U	U	NR	UJ	NR	U	NR	U	NR	NR	U	NR	UJ	NR	
Methoxychlor	40	NR	U	U	NR	UJ	NR	U	NR	U	NR	NR	U	NR	UJ	NR	

U - Not detected

J - Estimated

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 $\mu\text{g/l}$

NN - none noticeable

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1-N J A C 7 9-6

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TABLE 5-4
WITCO CORPORATION
PERTH AMBOY, N. J.
TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-6S 6/25/97	MW-6S Jan-98	MW-6S 6/22/98	MW-6F 12/2/94	MW-6F 6/13/95	MW-6F Jan-96	MW-6F Jun-96	MW-6F Jan-97	MW-6F 6/30/97	MW-6F Jan-98	MW-6F 6/22/98	MW-6F 12/2/94	MW-7P 6/8/95	MW-7P 95-DUP	MW-7P 1/29/96
Sample Date																
<hr/>																
Parameter																
TCL Base/ Neutral & Acid Extractable Organic Compounds																
Phenol	4000	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Naphthalene	a	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Pyrene	200	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Butylbenzylphthalate	100	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Benzo(a)anthracene	NC	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Chrysene	NC	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
bis(2-Ethylhexyl)phthalate	5	U	NR	U	NR	7.4J	NR	NS	NR	2.5J	NR	32	NR	3.1J	1.2J	NR
Benzo(a)pyrene	NC	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Benzo(g,h,i)perylene	NC	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Benzo(b)fluoranthene	5	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
4-Methylphenol	NC	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
2-Methylnaphthalene	NC	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Total Semi-VOCs (Js excluded)	.	U	NR	U	NR	U	NR	NS	NR	U	NR	32	NR	U	U	NR
Total Semi-VOCs (Js included)	.	U	NR	U	NR	7.4	NR	NS	NR	2.5	NR	32	NR	3.1	1.2	NR
TICs (estimated)		543,400	NR	44,060	NR	U	NR	NS	NR	10	NR	U	NR	13	14	NR
Total Semi-VOCs (Js and TICs included)		543,400	NR	44,060	NR	7.4	NR	NS	NR	12.5	NR	32	NR	16.1	15.2	NR
Total Petroleum Hydrocarbons (TPH)																
TPH	NN	14,300	NR	5,000	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Polychlorinated Biphenyls (PCBs)																
Total PCBs	1	U	0.7	U	U	U	U	NS	1.9	U	U	U	4.2	U	U	U
Organochlorine Pesticides																
Heptachlor	0.4	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR
Methoxychlor	40	U	NR	U	NR	U	NR	NS	NR	U	NR	U	NR	U	U	NR

U - Not detected

J - Estimated

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

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1-N J A C 7 9-6

Shading indicates concentration exceeds Standard.

TABLE 5-4
WITCO CORPORATION
PERTH AMBOY, N. J.

TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-7P 6/12/96	MW-7P Jan-97	MW-7P 6/25/97	MW-7P Jan-98	MW-7P 6/19/98	MW-7S 12/2/94	MW-7S 6/8/95	MW-7S 1/29/96	MW-7S 6/12/96	MW-7S Jan-97	MW-7S 6/26/97	MW-7S Jan-98	MW-7S 6/19/98	MW-8P 12/1/94	MW-8P 6/8/95
Parameter																
TCL Base/ Neutral & Acid Extractable Organic Compounds																
Phenol	4000	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Naphthalene	a	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Pyrene	200	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Butylbenzylphthalate	100	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Benzo(a)anthracene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Chrysene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
bis(2-Ethylhexyl)phthalate	5	U	NR	U	NR	U	NR	NA	NR	U	NR	1.8	NR	38	NR	U
Benzo(a)pyrene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Benzo(g,h,i)perylene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Benzo(b)fluoranthene	5	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
4-Methylphenol	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
2-Methylnaphthalene	NC	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Total Semi-VOCs (Js excluded)	.	U	NR	U	NR	U	NR	NA	NR	U	NR	1.8	NR	38	NR	U
Total Semi-VOCs (Js included)		U	NR	U	NR	U	NR	NA	NR	U	NR	1.8	NR	38	NR	U
TICs (estimated)		U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Total Semi-VOCs (Js and TICs included)		U	NR	U	NR	U	NR	NA	NR	U	NR	1.8	NR	38	NR	U
Total Petroleum Hydrocarbons (TPH)																
TPH	NN	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Polychlorinated Biphenyls (PCBs)																
Total PCBs	1	U	U	U	U	U	U	U	U	U	U	U	U	U	3.3	3.4
Organochlorine Pesticides																
Heptachlor	0.4	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U
Methoxychlor	40	U	NR	U	NR	U	NR	NA	NR	U	NR	U	NR	U	NR	U

U - Not detected

J - Estimated

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(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

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1-N.J.A.C 7.9-6

Shading indicates concentration exceeds Standard.

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-8P 01/26/96	MW-8P 6/13/96	MW-8P Jan-97	MW-8P 6/27/97	MW-8P Jan-98	MW-8P 6/23/98	MW-8S 12/1/94	MW-8S 6/8/95	MW-8S 1/26/96	MW-8S 06/13/96	MW-8S Jan-97	MW-8S DUP 1/97	MW-8S 6/27/97	MW-8S Jan-98
Sample Date															
Parameter															
TCL Base/ Neutral & Acid Extractable Organic Compounds															
Phenol	4000	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Naphthalene	a	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Pyrene	200	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Butylbenzylphthalate	100	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Benzo(a)anthracene	NC	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Chrysene	NC	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
bis(2-Ethylhexyl)phthalate	5	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Benzo(a)pyrene	NC	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Benzo(g,h,i)perylene	NC	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Benzo(b)fluoranthene	5	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
4-Methylphenol	NC	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
2-Methylnaphthalene	NC	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Total Semi-VOCs (Js excluded)	.	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Total Semi-VOCs (Js included)		NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
TICs (estimated)		NR	U	NR	U	NR	29	NR	NA	NR	U	NR	NR	13	NR
Total Semi-VOCs (Js and TICs included)		NR	U	NR	U	NR	29	NR	NA	NR	U	NR	NR	13	NR
Total Petroleum Hydrocarbons (TPH)															
TPH	NN	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Polychlorinated Biphenyls (PCBs)															
Total PCBs	1	2.7	6.5	1.2	U	U	1.1	1	U	U	4.3	0.12J	0.4	U	U
Organochlorine Pesticides															
Heptachlor	0.4	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR
Methoxychlor	40	NR	U	NR	U	NR	U	NR	NA	NR	U	NR	NR	U	NR

U - Not detected

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(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

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1-N J A C 7.9-6

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PERTH AMBOY, N. J.

TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-8S 6/23/98	MW-8D 12/1/94	MW-8D 6/12/95	MW-8D 01/26/96	MW-8D 06/13/96	MW-8D Jan-97	MW-8D 6/27/97	MW-8D Jan-98	MW-8D 6/23/98	MW-8D 12/7/94	MW-9S 6/13/95	MW-9S 1/31/96	MW-9S 6/14/96	MW-9S Jan-97
<hr/>															
Parameter															
TCL Base/ Neutral & Acid Extractable Organic Compounds															
Phenol	4000	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Naphthalene	a	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Pyrene	200	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Butylbenzylphthalate	100	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Benzo(a)anthracene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Chrysene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
bis(2-Ethylhexyl)phthalate	5	8.5	NR	U	NR	U	NR	U	NR	U	NR	1.5	NR	3.2J	NR
Benzo(a)pyrene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Benzo(g,h,i)perylene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Benzo(b)fluoranthene	5	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
4-Methylphenol	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
2-Methylnaphthalene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Total Semi-VOCs (Js excluded)	.	8.5	NR	U	NR	U	NR	U	NR	U	NR	1.5	NR	U	NR
Total Semi-VOCs (Js included)	.	8.5	NR	U	NR	U	NR	U	NR	U	NR	1.5	NR	3.2	NR
TICs (estimated)	.	33	NR	24	NR	U	NR	31	NR	U	NR	U	NR	U	NR
Total Semi-VOCs (Js and TICs included)	.	41.5	NR	24	NR	U	NR	31	NR	1.5	NR	3.2	NR	2.7	NR
Total Petroleum Hydrocarbons (TPH)															
TPH	NN	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR
Polychlorinated Biphenyls (PCBs)															
Total PCBs	1	U	1.9	1.6	2.4	4.6	1	U	U	U	U	U	U	UJ	UJ
Organochlorine Pesticides															
Heptachlor	0.4	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	UJ	NR
Methoxychlor	40	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	UJ	NR

U - Not detected.

J - Estimated.

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(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

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NA - not analyzed

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1-N J A C. 7 9-6

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TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality	MW-9S	MW-9S	MW-9S	MW-9F	MW-9F	MW-9F	MW-9F	MW-9F	MW-9F	MW-9F	MW-9F	MW-9F	MW-9F	MW-10S	MW-10S	MW-10S
Sample Date	Standards ¹ (µg/L)	6/26/97	Jan-98	6/19/98	12/1/94	6/8/95	1/29/96	6/13/96	Jan-97	7/2/97	98-DUP	Jan-98	6/18/98	6/13/95	1/31/96	6/14/96	
Parameter																	
TCL Base/ Neutral & Acid Extractable Organic Compounds																	
Phenol	4000	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Naphthalene	a	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Pyrene	200	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Butylbenzylphthalate	100	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Benzo(a)anthracene	NC	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Chrysene	NC	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
bis(2-Ethylhexyl)phthalate	5	1.4	NR	U	NR	U	NR	U	NR	1.4J	4.3	NR	3.1	2J	NR	1.6	
Benzo(a)pyrene	NC	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Benzo(g,h,i)perylene	NC	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Benzo(b)fluoranthene	5	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
4-Methylphenol	NC	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
2-Methylnaphthalene	NC	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	U	
Total Semi-VOCs (Js excluded)	.	1.4	NR	U	NR	U	NR	U	NR	U	4.3	NR	3.1	U	NR	1.6	
Total Semi-VOCs (Js included)		1.4	NR	U	NR	U	NR	U	NR	1.4	4.3	NR	3.1	2	NR	1.6	
TICs (estimated)			U	NR	U	NR	6	NR	U	NR	27	34	NR	50	4	NR	U
Total Semi-VOCs (Js and TICs included)		1.4	NR	U	NR	6	NR	U	NR	28.4	38.3	NR	53.1	6	NR	1.6	
Total Petroleum Hydrocarbons (TPH)																	
TPH	NN	U	NR	U	NR	520	NR	U	NR	U	U	NR	U	U	NR	U	
Polychlorinated Biphenyls (PCBs)																	
Total PCBs	1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	UJ	
Organochlorine Pesticides																	
Heptachlor	0.4	U	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	UJ	
Methoxychlor	40	8	NR	U	NR	U	NR	U	NR	U	U	NR	U	U	NR	UJ	

U - Not detected.

J - Estimated

R - Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J A C 7 9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-10S Jan-97	MW-10S 6/26/97	MW-10S Jan-98	MW-10S 6/16/98	MW-11S 12/5/94	MW-11S 6/8/95	MW-11S 1/31/96	MW-11S 6/17/96	MW-11S 96-DUP	MW-11S Jan-97	MW-11S 6/25/97	MW-11S Jan-98	MW-11S 6/22/98	
Sample Date															
<hr/>															
Parameter															
TCL Base/ Neutral & Acid Extractable Organic Compounds															
Phenol	4000	NR	U	NR	U	NR	U	NR	U	NR	8.1	NR	U		
Naphthalene	a	NR	U	NR	U	NR	960	NR	610	460	NR	820	NR	290	
Pyrene	200	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
Butylbenzylphthalate	100	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
Benzo(a)anthracene	NC	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
Chrysene	NC	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
bis(2-Ethylhexyl)phthalate	5	NR	U	NR	2.8	NR	U	NR	U	3.7	NR	U	NR	U	
Benzo(a)pyrene	NC	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
Benzo(g,h,i)perylene	NC	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
Benzo(b)fluoranthene	5	NR	U	NR	U	NR	U	NR	U	U	NR	U	NR	U	
4-Methylphenol	NC	NR	U	NR	U	NR	50J	NR	U	U	NR	U	NR	U	
2-Methylnaphthalene	NC	NR	U	NR	U	NR	11J	NR	U	U	NR	U	NR	U	
Total Semi-VOCs (Js excluded)	.	NR	U	NR	2.8	NR	960	NR	610	463.7	NR	828.1	NR	290	
Total Semi-VOCs (Js included)		NR	U	NR	2.8	NR	1,021	NR	610	463.7	NR	828.1	NR	290	
TICs (estimated)		NR	U	NR	U	NR	7,079	NR	6,750	4,853	NR	4,129	NR	4,190	
Total Semi-VOCs (Js and TICs included)		NR	U	NR	2.8	NR	8,100	NR	7,360	5,316.7	NR	4,957.1	NR	4,480	
Total Petroleum Hydrocarbons (TPH)															
TPH	NN	NR	U	NR	U	NR	870	NR	1,700	2,700	NR	6,800	NR	2,600	
Polychlorinated Biphenyls (PCBs)															
Total PCBs	1	U	U	U	U	2.1	U	R	0.73	0.3	U	U	U	U	
Organochlorine Pesticides															
Heptachlor	0.4	NR	U	NR	U	NR	U	NR	U	UJ	NR	UJ	NR	U	
Methoxychlor	40	NR	U	NR	U	NR	U	NR	U	UJ	NR	UJ	NR	U	

U - Not detected

J - Estimated

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J A C 7.9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
WITCO CORPORATION
PERTH AMBOY, N. J.

TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ ($\mu\text{g/L}$)	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-11D	MW-12S	MW-12S	MW-12S
Sample Date		12/5/94	6/8/95	1/31/96	6/17/96	7/12/96	Jan-97	6/25/97	97-DUP	Jan-98	6/22/98	12/5/94	6/14/95			2/1/96
Parameter																
TCL Base/ Neutral & Acid Extractable Organic Compounds																
Phenol	4000	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	U	NR	NR
Naphthalene	a	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	U	NR	NR
Pyrene	200	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	U	NR	NR
Butylbenzylphthalate	100	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	U	NR	NR
Benzo(a)anthracene	NC	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
Chrysene	NC	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
bis(2-Ethylhexyl)phthalate	5	NR	1J	NR	NA	U	NR	2	1.3	NR	U	NR	U	U	NR	NR
Benzo(a)pyrene	NC	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
Benzo(g,h,i)perylene	NC	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
Benzo(b)fluoranthene	5	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
4-Methylphenol	NC	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
2-Methylnaphthalene	NC	NR	U	NR	NA	U	NR	U	U	NR	U	NR	U	NR	U	NR
Total Semi-VOCs (Js excluded)	.	NR	U	NR	NA	U	NR	2	1.3	NR	U	NR	U	U	NR	NR
Total Semi-VOCs (Js included)		NR	1	NR	NA	U	NR	2	1.3	NR	U	NR	U	U	NR	NR
TICs (estimated)		NR	11	NR	NA	U	NR	154	89	NR	U	NR	U	U	NR	NR
Total Semi-VOCs (Js and TICs included)		NR	12	NR	NA	U	NR	156	90.3	NR	U	NR	U	U	NR	NR
Total Petroleum Hydrocarbons (TPH)																
TPH	NN	NR	U	NR	U	NA	NR	U	U	NR	U	NR	U	NR	U	NR
Polychlorinated Biphenyls (PCBs)																
Total PCBs	1	U	U	U	U	NA	U	U	U	U	U	U	U	U	U	U
Organochlorine Pesticides																
Heptachlor	0.4	NR	U	NR	U	NA	NR	U	U	NR	U	NR	U	NR	U	NR
Methoxychlor	40	NR	U	NR	U	NA	NR	U	U	NR	U	NR	U	NR	U	NR

U - Not detected

J - Estimated

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 $\mu\text{g/l}$

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J.A.C. 7:9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
WITCO CORPORATION
PERTH AMBOY, N. J.
TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-12S 6/17/96	MW-12S 7/12/96	MW-12S Jan-97	MW-12S 6/24/97	MW-12S Jan-98	MW-12S 6/18/98	MW-13S 12/6/94	MW-13S 6/14/95	MW-13S 1/30/96	MW-13S 6/18/96	MW-13S Jan-97	MW-13S 7/1/97	MW-13S 6/16/98
Sample Date														
Parameter														
TCL Base/ Neutral & Acid Extractable Organic Compounds														
Phenol	4000	NA	U	NR	U	NR	U	NR	3.5J	NR	U	NR	U	U
Naphthalene	a	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Pyrene	200	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Butylbenzylphthalate	100	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Benzo(a)anthracene	NC	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Chrysene	NC	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
bis(2-Ethylhexyl)phthalate	5	NA	U	NR	U	NR	1.7	NR	U	NR	U	NR	3.9J	5.2
Benzo(a)pyrene	NC	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Benzo(g,h,i)perylene	NC	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Benzo(b)fluoranthene	5	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
4-Methylphenol	NC	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
2-Methylnaphthalene	NC	NA	U	NR	U	NR	U	NR	U	NR	U	NR	U	U
Total Semi-VOCs (Js excluded)	.	NA	U	NR	U	NR	1.7	NR	U	NR	U	NR	U	5.2
Total Semi-VOCs (Js included)	.	NA	U	NR	U	NR	1.7	NR	3.5	NR	U	NR	3.9	5.2
TICs (estimated)	.	NA	U	NR	U	NR	U	NR	35	NR	U	NR	U	U
Total Semi-VOCs (Js and TICs included)	.	NA	U	NR	U	NR	1.7	NR	38.5	NR	U	NR	3.9	5.2
Total Petroleum Hydrocarbons (TPH)														
TPH	NN	U	NA	NR	U	NR	U	NR	U	NR	U	NR	U	U
Polychlorinated Biphenyls (PCBs)														
Total PCBs	1	U	NA	U	U	U	U	U	U	U	U	U	U	U
Organochlorine Pesticides														
Heptachlor	0.4	U	NA	NR	U	NR	U	NR	U	NR	U	NR	U	U
Methoxychlor	40	U	NA	NR	U	NR	U	NR	U	NR	U	NR	U	U

U - Not detected.

J - Estimated

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J.A.C. 7.9-6

Shading indicates concentration exceeds Standard.

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-13F 12/6/94	MW-13F 6/14/95	MW-13F 2/1/96	MW-13F 6/19/96	MW-13F Jan-97	MW-13F 7/1/97	MW-13F 97-DUP	MW-13F Jan-98	MW-13F 6/18/98	MW-13F 12/6/94	MW-14P 6/12/95	MW-14P 1/30/96	MW-14P 96-DUP
Sample Date														
Parameter														
TCL Base/ Neutral & Acid Extractable Organic Compounds														
Phenol	4000	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Naphthalene	a	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Pyrene	200	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Butylbenzylphthalate	100	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Benzo(a)anthracene	NC	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Chrysene	NC	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
bis(2-Ethylhexyl)phthalate	5	NR	U	NR	U	NR	1.4J	U	NR	U	NR	NA	NR	NR
Benzo(a)pyrene	NC	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Benzo(g,h,i)perylene	NC	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Benzo(b)fluoranthene	5	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
4-Methylphenol	NC	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
2-Methylnaphthalene	NC	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Total Semi-VOCs (Js excluded)	.	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Total Semi-VOCs (Js included)		NR	U	NR	U	NR	1.4	U	NR	U	NR	NA	NR	NR
TICs (estimated)		NR	13	NR	U	NR	18	11	NR	U	NR	NA	NR	NR
Total Semi-VOCs (Js and TICs included)		NR	13	NR	U	NR	19.4	11	NR	U	NR	NA	NR	NR
Total Petroleum Hydrocarbons (TPH)														
TPH	NN	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Polychlorinated Biphenyls (PCBs)														
Total PCBs	1	U	U	U	U	U	U	U	U	U	U	U	U	U
Organochlorine Pesticides														
Heptachlor	0.4	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR
Methoxychlor	40	NR	U	NR	U	NR	U	U	NR	U	NR	NA	NR	NR

U - Not detected

J - Estimated

R- Data were rejected

(a) the sum of Toluene Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-NJ A C 7.9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-14P 6/18/96	MW-14P Jan-97	MW-14P 7/1/97	MW-14P Jan-98	MW-14P 6/16/98	MW-14S 12/6/94	MW-14S 6/14/95	MW-14S 1/30/96	MW-14S 6/18/96	MW-14S Jan-97	MW-14S 7/1/97	MW-14S Jan-98	MW-14S 6/16/98
Sample Date														
Parameter														
TCL Base/ Neutral & Acid Extractable Organic Compounds														
Phenol	4000	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Naphthalene	a	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Pyrene	200	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Butylbenzylphthalate	100	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Benzo(a)anthracene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Chrysene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
bis(2-Ethylhexyl)phthalate	5	U	NR	2.2J	NR	5.7	NR	U	NR	U	NR	1.3J	NR	9.6
Benzo(a)pyrene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Benzo(g,h,i)perylene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Benzo(b)fluoranthene	5	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
4-Methylphenol	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
2-Methylnaphthalene	NC	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Total Semi-VOCs (Js excluded)	.	U	NR	U	NR	5.7	NR	U	NR	U	NR	U	NR	9.6
Total Semi-VOCs (Js included)	.	U	NR	2.2	NR	5.7	NR	U	NR	U	NR	1.3	NR	9.6
TICs (estimated)	.	U	NR	U	NR	99	NR	193	NR	U	NR	22	NR	43
Total Semi-VOCs (Js and TICs included)	.	U	NR	2.2	NR	104.7	NR	193	NR	U	NR	23.3	NR	52.6
Total Petroleum Hydrocarbons (TPH)														
TPH	NN	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Polychlorinated Biphenyls (PCBs)														
Total PCBs	1	U	NS	U	U	U	U	U	U	UJ	U	U	U	U
Organochlorine Pesticides														
Heptachlor	0.4	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U
Methoxychlor	40	U	NR	U	NR	U	NR	U	NR	U	NR	U	NR	U

U - Not detected

J - Estimated.

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J A C 7 9-6

Shading indicates concentration exceeds Standard

TABLE 5-4
 WITCO CORPORATION
 PERTH AMBOY, N. J.
 TCL BASE/NEUTRAL ACID EXTRACTABLE ORGANIC COMPOUNDS, TPH, PCBs,
 AND ORGANOCHLORINE PESTICIDES IN GROUNDWATER SAMPLES (in µg/l)
 NOVEMBER1994 - JUNE 1998

Sample Number	Ground Water Quality Standards ¹ (µg/L)	MW-15S 12/6/94	MW-15S 1/30/96	MW-15S 6/18/96	MW-15S Jan-97	MW-15S 7/1/97	MW-15S Jan-98	MW-15S 6/17/98
Sample Date								
Parameter								
TCL Base/ Neutral & Acid Extractable Organic Compounds								
Phenol	4000	NR	NR	U	NR	U	NR	U
Naphthalene	a	NR	NR	U	NR	U	NR	U
Pyrene	200	NR	NR	UJ	NR	U	NR	U
Butylbenzylphthalate	100	NR	NR	UJ	NR	U	NR	U
Benzo(a)anthracene	NC	NR	NR	UJ	NR	U	NR	U
Chrysene	NC	NR	NR	UJ	NR	U	NR	U
bis(2-Ethylhexyl)phthalate	5	NR	NR	UJ	NR	U	NR	8.4
Benzo(a)pyrene	NC	NR	NR	UJ	NR	U	NR	U
Benzo(g,h,i)perylene	NC	NR	NR	UJ	NR	U	NR	U
Benzo(b)fluoranthene	5	NR	NR	U	NR	U	NR	U
4-Methylphenol	NC	NR	NR	U	NR	U	NR	U
2-Methylnaphthalene	NC	NR	NR	U	NR	U	NR	U
Total Semi-VOCs (Js excluded)	.	NR	NR	U	NR	U	NR	8.4
Total Semi-VOCs (Js included)		NR	NR	U	NR	1.2	NR	8.4
TICs (estimated)		NR	NR	U	NR	22	NR	20
Total Semi-VOCs (Js and TICs included)		NR	NR	U	NR	23.2	NR	28.4
Total Petroleum Hydrocarbons (TPH)								
TPH	NN	NR	NR	U	NR	U	NR	U
Polychlorinated Biphenyls (PCBs)								
Total PCBs	1	U	UJ	U	U	U	U	U
Organochlorine Pesticides								
Heptachlor	0.4	NR	NR	UJ	NR	U	NR	U
Methoxychlor	40	NR	NR	UJ	NR	U	NR	U

U - Not detected

J - Estimated.

R- Data were rejected

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 µg/l

NN - none noticeable

NS- not sampled

NA- not analyzed

NC-no criteria

NR-not required

1-N J A C 7 9-6

Shading indicates concentration exceeds Standard

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-1S 6/14/95	MW-1S 6/13/96	MW-1S 96-DUP	MW-1S 7/2/97	MW-1S 6/18/98	MW-2D 6/13/95
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	NA	2310	2790	1610	1320	NA
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	3.8	5	2.8B	U	U
Barium	2000	NA	113	127	98.6B	96.7	NA
Beryllium	20	6.6	3.2	3.8	3.2B	1.7	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	NA	23200	29600	18800	27000	NA
Chromium	100	U	6	7.2	6.3B	4.8	U
Cobalt	NC	NA	67.7	66.8J	70.8	60.6	NA
Copper	1000	U	21	27.2	14.1B	16.9	U
Iron	300	NA	61500	79700	62500	49300	NA
Lead	10	4.9	2.5J	6J	2.2B	U	4.3
Magnesium	NC	NA	11800	11900	12200	15100	NA
Manganese	50	NA	1620	1630	1830J	2050	NA
Mercury	2	U	U	U	U	U	U
Nickel	100	64	98.1	98.4	94B	79.9	U
Potassium	NC	NA	860	1980	1730B	1790	NA
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	NA	43700	43300	47600J	46600	NA
Thallium	10	2	U	U	U	U	U
Vanadium	NC	NA	8.6	1.03	9.5B	5	NA
Zinc	5000	12000	229	233	276	122	61

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-2D 6/12/96	MW-2D 7/2/97	MW-2D 6/16/98	MW-3D 6/14/95	MW-3D 6/12/96	MW-3D 6/27/97
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	1200J	409	188	NA	583J	153B
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	2.3B	U	U	U	U
Barium	2000	86.7	76.6B	66.6	NA	87.9	74.5B
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	43100	30600	37200	NA	26700	21300
Chromium	100	47.9	17.5	5.8	13	12.1	7.1BJ
Cobalt	NC	1.2	U	U	NA	U	U
Copper	1000	40.7	17.9B	5.3	43	233	183
Iron	300	5730	4770	16300	NA	6380	15400
Lead	10	7.1	3.1	U	15	57.4	37.4
Magnesium	NC	7610	6930	9140	NA	6060	6020
Manganese	50	248	418J	398	NA	195	470
Mercury	2	U	U	U	U	U	U
Nickel	100	56.5	22.3B	7.7	U	12.1	6.5B
Potassium	NC	6300J	3700B	2000	NA	8100J	2870B
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	1B
Sodium	50,000	24400	25100	15700	NA	16800	12300J
Thallium	10	U	U	U	U	U	U
Vanadium	NC	2.1	1.0B	U	NA	U	U
Zinc	5000	24.4	30.5	6.6	65	44.8	46.5

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-3D 6/17/98	MW-3S 6/11/96	MW-3S 6/27/97	MW-3S 6/17/98	MW-4S 6/9/95	MW-4S 6/11/96
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	543	3610	871	770	NA	7080
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	8.9	5.1B	U	U	U
Barium	2000	80.1	42.7	34.5B	26.8	NA	248
Beryllium	20	U	0.48	U	U	U	1.4
Cadmium	4	1.1	0.42	1.9B	U	U	U
Calcium	NC	24300	22200	25400	24000	NA	74800
Chromium	100	25.9	29.9	38.1J	2.9	730	368
Cobalt	NC	U	49.9	49.0B	47.9	NA	61.4
Copper	1000	601	101	212	25.4	U	39.8
Iron	300	16400	74300	99700	28400	NA	25400
Lead	10	138	21.9	42.7	4.6	U	12.7
Magnesium	NC	6470	14100	15800	16000	NA	21300
Manganese	50	337	2590	2680	2820	NA	3590
Mercury	2	U	U	U	U	U	U
Nickel	100	24.6	37.6	55.3	30.1	170	333
Potassium	NC	13000	2250	1780B	1820	NA	2070
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	19900	31000J	33800J	35800	NA	28600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	2.1	10	3.7B	U	NA	29.3
Zinc	5000	117	106	287	59.5	66	84.2

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-4S 6/30/97	MW-4S 6/22/98	MW-4D 6/9/95	MW-4D 6/11/96	MW-4D 6/30/97	MW-4D 6/22/98
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	2200	2000	NA	3550	1440	546
Antimony	20	2.7B	U	U	U	U	U
Arsenic	8	3.2B	U	U	U	U	U
Barium	2000	133B	156	NA	95.9	112B	107
Beryllium	20	U	0.27	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	79500	84800	NA	46700	43400	40500
Chromium	100	317	439	13	74.6	23.5	22
Cobalt	NC	8.2B	8.3	NA	80.3	110	78.5
Copper	1000	8.8B	9.1	U	39.3	15.9B	12.8
Iron	300	7010	12200	NA	12300	11000	7850
Lead	10	U	3.1	U	6.3	3.6	U
Magnesium	NC	22000	24000	NA	9080	8540	8640
Manganese	50	592	1160	NA	396	414	378
Mercury	2	U	U	U	U	U	U
Nickel	100	195	315	76	106	73.1	57.4
Potassium	NC	1120B	1170	NA	6560J	2810B	3740
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	31600	33500	NA	21000	19600	20900
Thallium	10	U	U	U	U	U	U
Vanadium	NC	7.2B	8.7	NA	5.9	2.6B	1.9
Zinc	5000	29J	30.7	89	89.5	106J	69.5

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-4D DUP-98	MW-5D 6/9/95	MW-5D 6/10/96	MW-5D 6/30/97	MW-5D 6/17/98	MW-5S 6/11/96
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	794	NA	1870	718	3000	1340
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	115	NA	72.1	73.7B	83.5	68.1
Beryllium	20	U	U	U	U	0.33	0.78
Cadmium	4	U	U	U	U	4.8	U
Calcium	NC	44200	NA	16200	10700	76400	7330J
Chromium	100	47.9	U	234J	38.6J	80	20.5
Cobalt	NC	74.1	NA	3.8	U	2.1	70.8
Copper	1000	23.3	U	89.1	26.3	29.4	9.1
Iron	300	10600	NA	11800	32700	18600	14700
Lead	10	3.8	U	42.4J	10.6	13.6	3.5
Magnesium	NC	9420	NA	4190	4620	10700	10100J
Manganese	50	399	NA	476	625	406	2640J
Mercury	2	U	U	U	U	U	U
Nickel	100	74.3	U	220J	37.4B	41.4	76.8
Potassium	NC	3760	NA	12200	4750B	9490	2360
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	1.2B	U	U
Sodium	50,000	22300	NA	23900	13200J	16600	21300J
Thallium	10	U	U	U	U	U	U
Vanadium	NC	2.4	NA	5.5	2.7B	5.6	3.4
Zinc	5000	59.7	U	90.7	45.8	39.3	245

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

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NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-5S 6/30/97	MW-5S 6/15/98	MW-5F 6/9/95	MW-5F 6/10/96	MW-5F 7/2/97	MW-5F 6/17/98
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	10700	1970	NA	4770	1080	681
Antimony	20	U	U	U	U	U	U
Arsenic	8	5.9B	93.9	U	U	U	U
Barium	2000	185B	250	NA	157	63.7B	79.1
Beryllium	20	4B	U	U	U	U	U
Cadmium	4	U	U	U	U	U	0.63
Calcium	NC	43800	103000	NA	82300	62600	12000
Chromium	100	145	4.5	77	444J	52.9	16.1
Cobalt	NC	116	3.7	NA	7.7	1.7B	U
Copper	1000	67	5.3	U	166	31.8	10.7
Iron	300	93300	24000	NA	11200	7900	26600
Lead	10	43.1	2.2	U	40.8J	7.3	5.4
Magnesium	NC	9660	16500	NA	6540	9830	5610
Manganese	50	2320	1320	NA	218	441J	1320
Mercury	2	0.3	0.12	U	U	U	U
Nickel	100	193	4.8	58	434J	61.2	20.2
Potassium	NC	1930B	2610	NA	34500	6710J	2930
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	R	92700	NA	19000	11600	13600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	22.9B	16	NA	11.7	3B	U
Zinc	5000	595J	23.3	20	84	32.9J	31.2

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

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NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
WITCO CORPORATION
PERTH AMBOY, NEW JERSEY
TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-6S 6/13/95	MW-6S 6/12/96	MW-6S 6/25/97	MW-6S 6/22/98	MW-6F 6/13/95	MW-6F 6/30/97
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	NA	6170J	473	391	NA	255
Antimony	20	U	U	U	U	U	U
Arsenic	8	27	63.3	41.6	U	U	U
Barium	2000	NA	5390	5100	3170	NA	46.8B
Beryllium	20	U	2.8	0.97B	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	NA	139000	138000	119000	NA	R
Chromium	100	110	20.7	19.6	U	U	U
Cobalt	NC	NA	286	62.2	58.1	NA	5.6B
Copper	1000	U	U	U	U	U	2.2B
Iron	300	NA	1550000	1750000	774000	NA	8300
Lead	10	21	U	U	U	U	U
Magnesium	NC	NA	223000	213000	150000	NA	7680
Manganese	50	NA	50000	42200	22800	NA	1150
Mercury	2	U	U	0.15B	U	U	U
Nickel	100	U	28.3	16.7B	20.3	U	7.5B
Potassium	NC	NA	3030	1540B	3040	NA	R
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	3.7B	U	U	U
Sodium	50,000	NA	149000	158000	157000	NA	20300
Thallium	10	U	U	U	U	U	U
Vanadium	NC	NA	71.1	30.7B	15.2	NA	U
Zinc	5000	U	U	R	U	U	33.8J

U - not detected

J - estimated

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NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-6F 6/22/98	MW-7P 6/8/95	MW-7P 95-DUP	MW-7P 6/12/96	MW-7P 6/25/97	MW-7P 6/19/98
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	4810	NA	NA	5120J	1150	770
Antimony	20	U	U	U	20.2	U	5.4
Arsenic	8	U	U	U	5.4	U	U
Barium	2000	71.1	NA	NA	38.5	41.4B	46.6
Beryllium	20	0.35	U	U	0.34	0.23B	0.36
Cadmium	4	4.6	U	U	U	U	U
Calcium	NC	49800	NA	NA	31500J	21500	20600
Chromium	100	51.9	69	38	55.1	17.9	14.3
Cobalt	NC	6.8	NA	NA	18.5	12.4B	8.2
Copper	1000	55.7	U	U	20.2	6.7B	5
Iron	300	17500	NA	NA	14400	4170	1960
Lead	10	20.9	4.2	4.1	5.5	U	U
Magnesium	NC	8530	NA	NA	6680	6790	6910
Manganese	50	364	NA	NA	647	296	241
Mercury	2	0.25	U	U	U	U	U
Nickel	100	58.2	U	U	21.1	19.7B	16.9
Potassium	NC	10700	NA	NA	5830J	5450	4690
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	11900	NA	NA	20500J	19100	21200
Thallium	10	U	U	U	U	U	U
Vanadium	NC	13.1	NA	NA	15.7	3.9B	3.3
Zinc	5000	88.4	98	100	68.5	63.3	64

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-7S 6/12/96	MW-7S 6/26/97	MW-7S 6/19/98	MW-8P 6/13/96	MW-8P 6/27/97	MW-8P 6/23/98
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	4140J	169B	1180	7040	1210	524
Antimony	20	U	U	U	U	U	U
Arsenic	8	4.3	U	U	U	U	U
Barium	2000	147	84.1B	89.9	128	85.8B	38.7
Beryllium	20	0.66	U	0.23	3.9	3.1B	0.91
Cadmium	4	U	U	U	U	0.4B	U
Calcium	NC	41600	14300	17600	16000	16300	24400
Chromium	100	23.2	3.9B	7	42.9	21.6J	24.3
Cobalt	NC	40.5	32.2B	32.8	17.8	19.1B	4.9
Copper	1000	55.6	5.7B	11.6	11.4	4.2B	4.4
Iron	300	136000	40400	39500	3350	895	1480
Lead	10	86.2	6.9	12.7	6.9	2B	U
Magnesium	NC	10200	9770	9650	4750	5810	4610
Manganese	50	1660	1520	1580	379	285	155
Mercury	2	U	U	U	U	U	U
Nickel	100	61.2	21B	25.5	40.5	33.8B	29.7
Potassium	NC	11400J	1670B	1860	3690	2800B	2930
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	2.9B	U
Sodium	50,000	32500J	27700J	27200	463.2	70500J	56100
Thallium	10	U	U	U	U	U	U
Vanadium	NC	8.1	U	3.9	8.7	2.3B	U
Zinc	5000	193	R	53.2	192	168	45.5

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-8S 6/13/96	MW-8S 6/27/97	MW-8S 6/23/98	MW-8D 6/12/95	MW-8D 6/13/96	MW-8D 6/27/97
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	637	543	141	NA	1580	134B
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	3.4B	U	U	U	U
Barium	2000	67.6	75.9B	59.7	NA	41.1	34.3B
Beryllium	20	U	0.24B	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	31900	32700	28400	NA	32400	29000
Chromium	100	9.4	26.2J	3.7	U	12.6	1.4BJ
Cobalt	NC	25.3	28.2B	23.2	NA	2.4	U
Copper	1000	11.2	16.1B	U	U	31.7	4.7B
Iron	300	73600	87100	49500	NA	15100	17900
Lead	10	U	3.2	U	U	6.8	U
Magnesium	NC	14700	15600	14600	NA	10300	10500
Manganese	50	1550	1620	1490	NA	736	629
Mercury	2	U	U	U	U	U	U
Nickel	100	32.8	45.7	23.4	U	25	1.9B
Potassium	NC	4870	3140B	1840	NA	2220	1190B
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	43200	43000J	43900	NA	26900	28500J
Thallium	10	U	U	U	U	U	U
Vanadium	NC	2.3	2.5B	U	NA	3.5	U
Zinc	5000	40.7	53.1	32.4	28	26	15B

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-8D 6/23/98	MW-9S 6/13/95	MW-9S 6/14/96	MW-9S 6/26/97	MW-9S 6/19/98	MW-9F 6/8/95
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	63.6	NA	5260	1580	6270	NA
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	36.2	NA	58.7	43.1B	82.6	NA
Beryllium	20	U	U	0.31	U	0.9	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	31000	NA	17100	16700	18700	NA
Chromium	100	2.6	23	14	5.1B	16.7	U
Cobalt	NC	2.1	NA	11.3	7.3B	17.6	NA
Copper	1000	4.6	27	20.4	7.8B	24.3	U
Iron	300	27900	NA	37500	12700	27000	NA
Lead	10	U	10	13.3	U	10.2	U
Magnesium	NC	11200	NA	7360	7540	8910	NA
Manganese	50	775	NA	1000	878	1150	NA
Mercury	2	U	U	U	U	U	U
Nickel	100	5.6	U	19.2	5.1B	15.5	U
Potassium	NC	1340	NA	1780	1390B	2510	NA
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	0.95B	U	U
Sodium	50,000	31500	NA	21500	22700	23400	NA
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	NA	9.2	4.4	22.2	NA
Zinc	5000	9.9	52	23.8J	25	43.2	U

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-9F 6/13/96	MW-9F 7/2/97	MW-9F 6/18/98	MW-9F DUP-98	MW-10S 6/13/95	MW-10S 6/14/96
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	738	316	138	131	NA	8590
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	13.5
Barium	2000	73.6	56.1B	52.4	52	NA	149
Beryllium	20	U	U	U	U	U	1
Cadmium	4	U	U	U	U	U	U
Calcium	NC	53100	49500	48100	47100	NA	26400
Chromium	100	147	8.1B	16.5	20.9	18	22.7
Cobalt	NC	1.5	U	1.7	1.5	NA	34.5
Copper	1000	28.6	12.4B	8.1	9.8	31	41.6
Iron	300	22500	21100	28900	28900	NA	45500
Lead	10	8.4	2.6B	2.8	U	26	20.9
Magnesium	NC	13700	12400	12700	12500	NA	12300
Manganese	50	722	607J	633	617	NA	7280
Mercury	2	U	U	U	U	U	U
Nickel	100	46.1	5.5B	13.4	15.6	U	35.7
Potassium	NC	23200J	6600	4670	4360	NA	4160
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	17800	14200	13900	13400	NA	45000
Thallium	10	U	U	U	U	U	U
Vanadium	NC	5.3	2.6B	U	U	NA	30.6
Zinc	5000	30.8	R	19.5	17.1	74	83.6

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-10S 6/26/97	MW-10S 6/16/98	MW-11S 6/8/95	MW-11S 6/17/96	MW-11S 96-DUP	MW-11S 6/25/97
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	1290	5180	NA	29300J	25200J	9810
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	7.9	12	33.4	29.4	26.3
Barium	2000	85B	119	NA	509	487	276
Beryllium	20	U	0.5	U	4	3.5	0.66B
Cadmium	4	U	U	U	U	U	U
Calcium	NC	23000J	31300	NA	50400	50600	48700
Chromium	100	12.2	16.4	U	100	80.3	54.5
Cobalt	NC	29.3B	26	NA	24.7	20.9	9.9B
Copper	1000	10.3B	16.3	U	108	93.8	42.7
Iron	300	12000	27100	NA	165000	154000	130000
Lead	10	4.5	6.9	U	250	209	150
Magnesium	NC	10200	13000	NA	27400	26800	25400
Manganese	50	6740	5470	NA	7510	7530	6140
Mercury	2	U	U	U	0.11	U	U
Nickel	100	19.4B	20.1	U	70.5	62.9	25.4B
Potassium	NC	1530B	3290	NA	5430J	5250J	4760B
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	36700J	34900	NA	18000	18100	30100
Thallium	10	U	U	U	U	U	U
Vanadium	NC	3.7B	14.5	NA	94.1	82	26.6B
Zinc	5000	38.8J	40.2	35	213	179	R

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-11S 6/22/98	MW-11D 6/8/95	MW-11D 6/17/96	MW-11D 6/25/97	MW-11D 97-DUP	MW-11D 6/22/98
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	559	NA	257J	U	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	16.4	U	U	U	U	U
Barium	2000	193	NA	62.7	68.7B	61.6B	32.3
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	58900	NA	48500	57800	54600	38500
Chromium	100	3.7	U	7.4	8.2B	9.1B	U
Cobalt	NC	4.9	NA	0.93	U	U	U
Copper	1000	5.2	U	8.4	U	4.8B	U
Iron	300	91500	NA	52300	22800	21900	14900
Lead	10	50.5	U	U	U	U	U
Magnesium	NC	23800	NA	8310	8150	8480	8430
Manganese	50	5920	NA	206	221	228	215
Mercury	2	U	U	U	U	U	U
Nickel	100	5.2	U	11.4	8.3B	9.1B	U
Potassium	NC	4320	NA	3450	1290	1350B	1160
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	31600	NA	11100	10400	10400	11600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	5.3	NA	U	U	U	U
Zinc	5000	13.5	U	9.9	12.2	R	7.5

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-12S 6/14/95	MW-12S 6/17/96	MW-12S 6/24/97	MW-12S 6/18/98	MW-13S 6/14/95	MW-13S 6/18/96
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	NA	92.6J	U	U	NA	3770
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	4.1	U	U	U	U
Barium	2000	NA	61.9	29.6B	31.7	NA	68.1
Beryllium	20	U	0.25	U	U	U	0.34
Cadmium	4	U	U	U	U	U	U
Calcium	NC	NA	46600	41500	42100	NA	9420
Chromium	100	U	2.3	2.3B	U	U	8.4
Cobalt	NC	NA	1.6	1.3B	1.2	NA	8
Copper	1000	U	4.6	U	U	U	5.5
Iron	300	NA	136000	39300	33200	NA	15400J
Lead	10	U	U	U	U	U	11.5
Magnesium	NC	NA	11700	11000	11400	NA	7760
Manganese	50	NA	449	422	473	NA	1100
Mercury	2	U	U	U	U	U	U
Nickel	100	U	10.5	2.6B	U	U	13.5
Potassium	NC	NA	1670	1560	1480	NA	1440
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	0.91B	U	U	U
Sodium	50,000	NA	13400	11700	13300	NA	18900
Thallium	10	U	U	U	U	U	U
Vanadium	NC	NA	U	U	U	NA	6
Zinc	5000	U	12.5	11.1B	5.9	43	24.5J

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-13S 7/1/97	MW-13S 6/16/98	MW-13F 6/14/95	MW-13F 6/19/96	MW-13F 7/1/97	MW-13F 97-DUP
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	5150	2630	NA	310	315	326
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	95.1B	57	NA	56.9	58.7B	58.5B
Beryllium	20	0.27B	U	U	U	U	U
Cadmium	4	U	U	U	10.4	1.7B	4B
Calcium	NC	R	9400	NA	50300	44400	44700
Chromium	100	10.6	6.5	U	2.6	4.3B	6B
Cobalt	NC	7.4B	6	NA	1.5	1.8B	1.6B
Copper	1000	10.1B	7.9	U	6.5	5B	6.3B
Iron	300	33300	18700	NA	2360J	11200	9860
Lead	10	6.7	6.2	7.6	U	U	U
Magnesium	NC	8100	8370	NA	11300	9330	9070
Manganese	50	1140	1100	NA	515	352J	354J
Mercury	2	U	U	U	U	U	U
Nickel	100	11.9B	9.7	U	12.5	2.2B	2.4B
Potassium	NC	R	1230	NA	4500	6550J	8570
Selenium	50	U	U	U	U	U	U
Silver	NC	1.3B	U	U	U	U	U
Sodium	50,000	19600	21700	NA	10600	10300	10500
Thallium	10	U	U	U	U	U	U
Vanadium	NC	9.3B	4.4	NA	U	1.8B	1.5B
Zinc	5000	36.4J	26.7	U	35.1	19.4B	24.5

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-13F 6/18/98	MW-14P 6/18/96	MW-14P 7/1/97	MW-14P 6/16/98	MW-14S 6/14/95	MW-14S 6/18/96
PARAMETER							
TOTAL INORGANICS							
Aluminum	200	U	2710	4840	2960	NA	1840
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	5.6
Barium	2000	58.3	33	42B	46	NA	175
Beryllium	20	U	1.9	2.3B	2.2	U	U
Cadmium	4	0.6	3.7	5.5J	12.3	U	U
Calcium	NC	45700	6620	6950	8770	NA	23800
Chromium	100	U	2.8	6.7B	2.2	U	14.1
Cobalt	NC	U	46.4	64.9	64.6	NA	5.4
Copper	1000	U	15.5	21.6B	570	U	51
Iron	300	16500	610J	3800	658	NA	10900J
Lead	10	U	U	3.3	3.1	6	20.1
Magnesium	NC	10900	5570	5370	6190	NA	9090
Manganese	50	389	1210	1610	1720	NA	1070
Mercury	2	U	0.25	0.5	0.41	U	U
Nickel	100	U	34.4	41	36.4	U	20.7
Potassium	NC	1610	940	1240B	1390	NA	3060
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	11300	22000	25000	30600	NA	19100
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	4.7B	U	NA	4.4
Zinc	5000	7.4	315	443J	350	U	18.4

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC - no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-5
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS DETECTED IN GROUNDWATER SAMPLES ($\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-14S 7/1/97	MW-14S 6/16/98	MW-15S 6/18/96	MW-15S 7/1/97	MW-15S 6/17/98
PARAMETER						
TOTAL INORGANICS						
Aluminum	200	324	95.4	3260	2510	1350
Antimony	20	U	U	U	U	U
Arsenic	8	U	U	3.3	U	U
Barium	2000	120B	123	72	86.6B	71.1
Beryllium	20	U	U	0.74	0.65B	0.51
Cadmium	4	U	U	4.6J	U	0.53
Calcium	NC	19900	21200	9120	9180	8890
Chromium	100	5.8B	U	17.6	5.7B	5.2
Cobalt	NC	2B	U	23	7.2B	8.5
Copper	1000	8.5B	U	32.6	17.2B	11
Iron	300	56600	60800	61600J	81400	50900
Lead	10	U	U	20.4	6	8.8
Magnesium	NC	8100	8690	8250J	5410	5860
Manganese	50	827	750	1210J	726	764
Mercury	2	U	U	U	U	U
Nickel	100	5.5B	U	96.5	10.1B	16.7
Potassium	NC	1280B	1080	1110	1050B	1100
Selenium	50	U	U	U	U	5
Silver	NC	U	U	U	U	U
Sodium	50,000	19700	24100	17700J	12700	14500
Thallium	10	U	U	U	U	U
Vanadium	NC	0.84B	U	6.2	2.7B	2.1
Zinc	5000 .	18.1B	6.7	533J	80.3J	106

U - not detected

J - estimated

B - concentration between detection limit and contract required detection limit.

R - analysis not of useable quality

NC- no criteria

NA - not analyzed

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-1S 6/14/95	MW-1S 6/13/96	MW-1S 96-DUP	MW-1S 7/2/97	MW-1S 6/18/98	MW-2D 6/13/95
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	NA	84.9	72.2	81.2B	151	NA
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	NA	70.5	58.4	63.3B	77.5	NA
Beryllium	20	U	0.98	0.92	0.90B	0.91	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	NA	11900	13600	15200	19700	NA
Chromium	100	U	U	U	U	3.1	U
Cobalt	NC	NA	70.7	74.7J	71.4	65.7	NA
Copper	1000	U	U	U	U	U	U
Iron	300	NA	7910	8160	9190	12900	NA
Lead	10	U	U	U	U	U	U
Magnesium	NC	NA	11500	12200	12700	14600	NA
Manganese	50	NA	1650	1740	1890J	2130	NA
Mercury	2	U	U	U	U	U	U
Nickel	100	58	92.7	98	92.6	75.8	U
Potassium	NC	NA	1560	1690	1900B	921	NA
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	NA	47200	49800J	51700J	43100	NA
Thallium	10	U	U	U	U	U	U
Vanadium	NC	NA	U	1.8	0.89B	U	NA
Zinc	5000	80	169	164	196	156	U

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-2D 6/12/96	MW-2D 7/2/97	MW-2D 6/16/98	MW-3D 6/14/95	MW-3D 6/12/96	MW-3D 6/27/97
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	U	NA	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	57	63.8B	64.8	NA	64.3	68.8B
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	41000	27900	35400	NA	23200	21500
Chromium	100	U	U	U	U	U	U
Cobalt	NC	U	U	U	NA	U	U
Copper	1000	U	1.9B	U	U	4.6	R
Iron	300	U	U	16300	NA	153	11700
Lead	10	U	U	U	U	U	U
Magnesium	NC	7820	7050	9030	NA	6430	6080
Manganese	50	133	408J	375	NA	143	505
Mercury	2	U	U	U	U	U	U
Nickel	100	2.1	3.2B	U	U	2.2	U
Potassium	NC	6540J	4020B	1040	NA	9550J	3670B
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	26400	26100	15300	NA	19100J	13400
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	U	NA	U	U
Zinc	5000	5.5	14.8B	8.5	U	9.6	R

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-3D 6/17/98	MW-3S 6/11/96	MW-3S 6/27/97	MW-3S 6/17/98	MW-4S 6/9/95	MW-4S 6/11/96
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	U	U	NA	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	67.6	21.4	23.6B	22.1	NA	114
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	20200	24000	24800	21100	NA	77800
Chromium	100	U	U	1.2BJ	U	U	U
Cobalt	NC	U	46.8	43.3B	65.2	NA	6.6
Copper	1000	U	U	R	U	U	U
Iron	300	14800	16700	15900	24300	NA	400
Lead	10	U	U	U	U	U	U
Magnesium	NC	6420	15100	15600	16400	NA	21300
Manganese	50	370	2770	2580	3230	NA	686
Mercury	2	U	U	U	U	U	U
Nickel	100	U	27.8	26.5B	38	76	49.4
Potassium	NC	1450	1810	1570B	1520	NA	852
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	13500	34500J	33700J	37500	NA	31400
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	U	U	NA	U
Zinc	5000	4.8	41.6	R	38.7	27	15.9

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-4S 6/30/97	MW-4S 6/22/98	MW-4D 6/9/95	MW-4D 6/11/96	MW-4D 6/30/97	MW-4D 6/22/98
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	NA	U	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	116B	127	NA	74.7	91.8B	80.6
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	83200	84700	NA	47300	44000	41900
Chromium	100	U	1.6	U	U	U	U
Cobalt	NC	3.6B	4	NA	42.8	30.3B	36.6
Copper	1000	U	U	U	U	2.7B	U
Iron	300	1260	1250	NA	6090	3050	2890
Lead	10	U	U	U	U	U	U
Magnesium	NC	22700	23600	NA	9600	8760	8990
Manganese	50	398	872	NA	277	189	289
Mercury	2	U	U	U	U	U	U
Nickel	100	156	239	76	53.6	35.7B	29.7
Potassium	NC	745B	738	NA	5640J	3020B	3000
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	33100	33200	NA	22200	208000	20600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	NA	U	U	U
Zinc	5000	R	17.6	63	55.1	R	32.3

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-4D 98-DUP	MW-5D 6/9/95	MW-5D 6/10/96	MW-5D 6/30/97	MW-5D 6/17/98	MW-5S 6/11/96
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	NA	U	U	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	83.6	NA	48.8	70.4B	49.7	56.6
Beryllium	20	U	U	U	U	U	0.29
Cadmium	4	U	U	U	U	U	U
Calcium	NC	43300	NA	10600	11300	59600	8180J
Chromium	100	U	U	UJ	U	U	U
Cobalt	NC	35.2	NA	U	U	U	78
Copper	1000	U	U	U	2.0B	U	U
Iron	300	3060	NA	465	22700	16200	3660
Lead	10	U	U	U	U	U	U
Magnesium	NC	9320	NA	3670	4580	9900	11300J
Manganese	50	289	NA	412	681	382	2970J
Mercury	2	U	U	U	U	U	U
Nickel	100	30.9	U	2.3J	2.8B	U	79
Potassium	NC	3100	NA	12300	4940B	5050	2440
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	21400	NA	24500	14200	14500	23900J
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	NA	U	U	U	U
Zinc	5000	28	U	12.4	R	6	247

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-5S 6/30/97	MW-5S 6/15/98	MW-5F 6/9/95	MW-5F 6/10/96	MW-5F 7/2/97	MW-5F 6/17/98
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	NA	U	U	88.9
Antimony	20	4.2B	U	U	U	U	U
Arsenic	8	U	3.2	U	U	U	U
Barium	2000	52.8B	U	NA	23.4	38.0B	70.8
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	15300	U	NA	39700	58300	10400
Chromium	100	U	U	13	2.7J	U	U
Cobalt	NC	75.2	1.5	NA	U	U	U
Copper	1000	2.6B	U	U	3.1	U	U
Iron	300	723	U	NA	U	13800	25500
Lead	10	U	U	U	U	U	U
Magnesium	NC	8900	U	NA	1580	9370	5140
Manganese	50	2120	U	NA	U	427J	627
Mercury	2	U	U	U	U	U	U
Nickel	100	96.8	U	U	UJ	5.6B	U
Potassium	NC	1760B	U	NA	31800	8700J	2120
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	R	U	NA	18400	12500	12600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	3.5	NA	2.1	U	U
Zinc	5000	R	8.1	U	19.1	38.6J	10.3

U - not detected

J - estimated

B - concentration exceeds machine detection limits
but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-6S 6/13/95	MW-6S 6/12/96	MW-6S 6/25/97	MW-6S 6/22/98	MW-6F 6/13/95	MW-6F 6/30/97
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	NA	497J	U	U	NA	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	18	61.1	U	U	U	U
Barium	2000	NA	5600	4560	3310	NA	27.6B
Beryllium	20	U	2.3	0.63B	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	NA	14700	126000	126000	NA	R
Chromium	100	U	U	12.8	U	U	U
Cobalt	NC	NA	298	51.7	57.2	NA	1.8B
Copper	1000	U	U	U	U	U	U
Iron	300	NA	1560000	1470000	815000	NA	2530
Lead	10	U	U	U	U	U	U
Magnesium	NC	NA	235000	199000	159000	NA	6590
Manganese	50	NA	52300	39500	24500	NA	228
Mercury	2	U	U	U	U	U	U
Nickel	100	U	8.7	14.5B	14.2	U	5.4B
Potassium	NC	NA	2020	1780B	3040	NA	R
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	5.2B	U	U	U
Sodium	50,000	NA	160000	157000	164000	NA	10700
Thallium	10	U	U	U	U	U	U
Vanadium	NC	NA	26.8	U	U	NA	U
Zinc	5000	U	U	R	U	U	R

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-6F 6/22/98	MW-7P 6/8/95	MW-7P 95-DUP	MW-7P 6/12/96	MW-7P 6/25/97	MW-7P 6/19/98
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	NA	NA	U	U	U
Antimony	20	U	U	U	10.4	U	U
Arsenic	8	U	U	U	5.1	U	U
Barium	2000	39.6	NA	NA	23.5	40.0B	39.9
Beryllium	20	U	U	U	U	U	0.2
Cadmium	4	U	U	U	U	U	U
Calcium	NC	30500	NA	NA	35700J	22700	26100
Chromium	100	U	U	U	U	U	U
Cobalt	NC	1.5	NA	NA	15.9	10.2B	10.2
Copper	1000	U	U	U	U	U	U
Iron	300	8940	NA	NA	3720	128	882
Lead	10	U	U	U	U	U	U
Magnesium	NC	6980	NA	NA	6930	7000	7500
Manganese	50	189	NA	NA	703	273	277
Mercury	2	U	U	U	U	U	U
Nickel	100	U	U	U	10.5	16.2B	17.7
Potassium	NC	1330	NA	NA	5920J	5690	4770
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	10600	NA	NA	24700J	21100	23600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	NA	NA	U	U	U
Zinc	5000	7	U	63	10.1	54.4	35.6

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds
 N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-7S 6/12/96	MW-7S 6/26/97	MW-7S 6/19/98	MW-8P 6/13/96	MW-8P 6/27/97	MW-8P 6/23/98
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	U	746	1070	88.9
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	29.2	79.0B	84.1	115	79.7B	37.4
Beryllium	20	U	U	U	3.4	3.2B	0.84
Cadmium	4	U	U	U	U	U	U
Calcium	NC	24100	15100	16200	16800	16100	24600
Chromium	100	U	U	U	5.1	6.1BJ	3.2
Cobalt	NC	32.2	34.0B	37	11.2	18.6B	4.5
Copper	1000	U	U	U	U	U	U
Iron	300	14600	31800	33800	151	358	668
Lead	10	U	U	U	U	U	U
Magnesium	NC	10500	10500	10500	4560	5950	4550
Manganese	50	1620	1640	1750	244	274	130
Mercury	2	U	U	U	U	U	U
Nickel	100	19.1	19.5B	21.5	32.7	34.6B	27.9
Potassium	NC	10900J	2420B	1150	2960	2670B	2870
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	38800J	30800J	29900	46400	64000J	61300
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	U	U	U	U
Zinc	5000	14.7	R	18.6	164	R	41.8

U - not detected

J - estimated

B - concentration exceeds machine detection limits

but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-8S 6/13/96	MW-8S 6/27/97	MW-8S 6/23/98	MW-8D 6/12/95	MW-8D 6/13/96	MW-8D 6/27/97
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	U	NA	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	53.6	43.3B	55.2	NA	38.4	31.0B
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	30500	32500	30500	NA	31800	30100
Chromium	100	U	UJ	U	U	U	UJ
Cobalt	NC	23.6	25.2B	22.9	NA	1.3	U
Copper	1000	U	U	U	U	U	U
Iron	300	18800	22000	27600	NA	802	10800
Lead	10	U	U	U	U	U	U
Magnesium	NC	15000	16700	15800	NA	10500	10800
Manganese	50	1560	1670	1630	NA	712	649
Mercury	2	U	U	U	U	U	U
Nickel	100	20.6	21.3B	20.8	U	1.3	U
Potassium	NC	5270J	3920B	1430	NA	2080	1410B
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	45200	48100J	49100	NA	28200	29600J
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	U	NA	U	U
Zinc	5000	29.9	R	26.2	U	15.9	R

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds
 N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-8D 6/23/98	MW-9S 6/13/95	MW-9S 6/14/96	MW-9S 6/26/97	MW-9S 6/19/98	MW-9F 6/8/95
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	NA	U	U	U	NA
Antimony	20	U	U	U	U	4.4	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	33.1	NA	54	29.7B	31.9	NA
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	31300	NA	18200	17000	18700	NA
Chromium	100	U	U	U	UJ	1.4	U
Cobalt	NC	3.3	NA	7.2	5.3B	9.2	NA
Copper	1000	U	U	U	U	U	U
Iron	300	14500	NA	3790	6110	4900	NA
Lead	10	U	U	U	U	U	U
Magnesium	NC	11300	NA	7680	7500	7920	NA
Manganese	50	658	NA	967	873	1040	NA
Mercury	2	U	U	U	U	U	U
Nickel	100	U	U	2.9	1.7B	2.4	U
Potassium	NC	1180	NA	1100	918B	879	NA
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	32000	NA	23500	23900J	24600	NA
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	NA	U	U	U	NA
Zinc	5000	7	42	27.5J	15.8B	13.2	U

U - not detected

J - estimated

B - concentration exceeds machine detection limits

but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-9F 6/13/96	MW-9F 7/2/97	MW-9F 6/18/98	MW-9F 98-DUP	MW-10S 6/13/95	MW-10S 6/14/96
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	U	U	NA	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	60.5	51.7B	48.8	47.3	NA	85.9
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	52500	51900	47800	46700	NA	23300
Chromium	100	U	U	U	U	U	U
Cobalt	NC	U	U	U	2.9	NA	23.5
Copper	1000	U	U	U	U	U	U
Iron	300	1290	12700	27600	22600	NA	16200
Lead	10	U	U	U	U	U	U
Magnesium	NC	14200	13100	12200	11800	NA	10700
Manganese	50	636	627J	600	591	NA	7110
Mercury	2	U	U	U	U	U	U
Nickel	100	1.8	U	U	U	U	9.8
Potassium	NC	23700J	6870	1540	2790	NA	2660
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	18800	1500	12000	12000	NA	49300
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	U	U	NA	U
Zinc	5000	16.6	R	21.3	19.1	U	38.7

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds
 N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-10S 6/26/97	MW-10S 6/16/98	MW-11S 6/8/95	MW-11S 6/17/96	MW-11S 96-DUP	MW-11S 6/25/97
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	U	NA	239J	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	12	11.9	11.1	11.5
Barium	2000	59.9B	76.6	NA	244	251	207
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	25500J	33300	NA	43500	44400	46800
Chromium	100	2.0BJ	U	U	U	U	2.1B
Cobalt	NC	26.4B	21.2	NA	2.6	2.6	2.5B
Copper	1000	U	U	U	U	U	U
Iron	300	6700	7970	NA	10400	10600	102000
Lead	10	U	U	7.1	U	U	U
Magnesium	NC	11100	12500	NA	22000	22400	23100
Manganese	50	6720	5720	NA	7140	7280	5870
Mercury	2	U	U	U	U	U	U
Nickel	100	10.1B	8.7	U	1.4	1.5	3.3B
Potassium	NC	1470B	2620	NA	3540	3550	4220B
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	40700J	37400	NA	19600	20000	31000
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	NA	2.2	2	2.1B
Zinc	5000	50.6J	16.1	32	25.4	30.3	R

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in $\mu\text{g/l}$)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-11S 6/22/98	MW-11D 6/8/95	MW-11D 6/17/96	MW-11D 6/25/97	MW-11D 97-DUP	MW-11D 6/22/98
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	NA	U	U	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	7	U	U	U	U	U
Barium	2000	199	NA	40	31.3B	31.9B	30.2
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	62300	NA	41300	41800	42300	39300
Chromium	100	U	U	U	U	U	U
Cobalt	NC	11.5	NA	U	U	U	U
Copper	1000	U	U	U	U	U	U
Iron	300	71100	NA	4910	9420	9230	9540
Lead	10	U	U	U	U	U	U
Magnesium	NC	23800	NA	8470	8930	8980	8740
Manganese	50	5340	NA	193	221	234	222
Mercury	2	U	U	U	U	U	U
Nickel	100	5.9	U	1.5	U	U	U
Potassium	NC	4350	NA	3530	1280B	1400B	1160
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	32300	NA	11300	10900	11000	11700
Thallium	10	U	U	U	U	U	U
Vanadium	NC	2.3	NA	U	U	U	U
Zinc	5000	9.6	U	17.5	15.1B	R	5.1

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-12S 6/14/95	MW-12S 6/17/96	MW-12S 6/24/97	MW-12S 6/18/98	MW-13S 6/14/95	MW-13S 6/18/96
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	NA	U	U	65.3	NA	286
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	NA	35.6	26.0B	29.4	NA	54.6
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	U	U	U
Calcium	NC	NA	43500	44600	42600	NA	10200
Chromium	100	U	U	U	U	U	U
Cobalt	NC	NA	U	U	2.5	NA	7.3
Copper	1000	U	U	U	U	U	U
Iron	300	NA	5220	16800	20100	NA	5960J
Lead	10	U	U	U	U	U	U
Magnesium	NC	NA	11500	11800	11600	NA	7480
Manganese	50	NA	317	439	473	NA	1140
Mercury	2	U	U	U	U	U	U
Nickel	100	U	1.6	U	U	U	8.1
Potassium	NC	NA	1640	1680	1480	NA	912
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	NA	13500	12600	13600	NA	20400
Thallium	10	U	U	U	U	U	U
Vanadium	NC	NA	U	U	U	NA	U
Zinc	5000	U	17.4	13.1B	5.4	U	27.7J

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-13S 7/1/97	MW-13S 6/16/98	MW-13F 6/14/95	MW-13F 6/19/96	MW-13F 7/1/97	MW-13F 97-DUP
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	349	NA	U	U	U
Antimony	20	U	U	U	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	26.3B	37.9	NA	54.7	58.6B	57.5B
Beryllium	20	U	U	U	U	U	U
Cadmium	4	U	U	U	0.82	U	U
Calcium	NC	R	10100	NA	53000	43600	43400
Chromium	100	U	U	U	U	U	U
Cobalt	NC	2.3B	6.5	NA	0.99	1.4B	U
Copper	1000	1.8B	U	U	U	U	2.2B
Iron	300	2360	2800	NA	340J	9980	10200
Lead	10	U	U	U	U	U	U
Magnesium	NC	6620	8730	NA	12200	9610	9600
Manganese	50	279	1180	NA	465	379J	371J
Mercury	2	U	U	U	U	U	U
Nickel	100	5.5B	6.7	U	10.3	1.7B	U
Potassium	NC	R	748	NA	4640	8880J	8310
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	10800	23600	NA	11300	11200	11100
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	NA	U	U	U
Zinc	5000	R	24.3	U	19.4	R	R

U - not detected

J - estimated

B - concentration exceeds machine detection limits
but not contract required detection limit.

NC - no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds
N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-13F 6/18/98	MW-14P 6/18/96	MW-14P 7/1/97	MW-14P 6/16/98	MW-14S 6/14/95	MW-14S 6/18/96
PARAMETER							
DISSOLVED INORGANICS							
Aluminum	200	U	1700	2990	2780	NA	U
Antimony	20	U	U	2.5B	U	U	U
Arsenic	8	U	U	U	U	U	U
Barium	2000	53.5	31.4	35.9B	45.4	NA	138
Beryllium	20	U	1.7	2.3B	2.2	U	U
Cadmium	4	U	2.9	6.2J	4.7	U	U
Calcium	NC	42800	6780	6980	8630	NA	20800
Chromium	100	U	U	U	U	U	U
Cobalt	NC	U	40.6	69.5	68.9	NA	U
Copper	1000	U	9.2	12.7B	U	U	U
Iron	300	15600	UJ	U	376	NA	21600J
Lead	10	U	U	3	U	U	U
Magnesium	NC	10600	5600	5470	6960	NA	9210
Manganese	50	334	1110	1740	1720	NA	996
Mercury	2	U	U	U	U	U	U
Nickel	100	U	28.7	42.7	34.7	U	U
Potassium	NC	1330	1010	912B	1170	NA	2380
Selenium	50	U	U	U	U	U	U
Silver	NC	U	U	U	U	U	U
Sodium	50,000	11200	22200	27400	32900	NA	19600
Thallium	10	U	U	U	U	U	U
Vanadium	NC	U	U	U	U	NA	U
Zinc	5000	6.9	282	487J	355	U	18.7

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds

N.J.A.C. 7:9-6.

TABLE 5-6
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS DETECTED IN GROUNDWATER SAMPLES (in µg/l)
 JUNE 1995 - JUNE 1998

SAMPLE NUMBER SAMPLE DATE	Groundwater Quality Standards (NJAC 7:9-6)	MW-14S 7/1/97	MW-14S 6/16/98	MW-15S 6/18/96	MW-15S 7/1/97	MW-15S 6/17/98
PARAMETER						
DISSOLVED INORGANICS						
Aluminum	200	U	U	203	U	U
Antimony	20	U	U	U	2.3B	U
Arsenic	8	U	U	U	U	U
Barium	2000	108B	101	65.4	81.3B	80.4
Beryllium	20	U	U	0.29	U	U
Cadmium	4	U	U	5.9J	U	U
Calcium	NC	21000	22300	9220	9790	9870
Chromium	100	U	U	U	1.7B	U
Cobalt	NC	1.2B	3.4	28.9	6.3B	7.8
Copper	1000	U	U	4.9	U	U
Iron	300	27300	25300	3250J	26100	30600
Lead	10	U	U	U	U	U
Magnesium	NC	8660	9170	9620J	5600	6380
Manganese	50	842	731	1440J	759	817
Mercury	2	U	U	U	U	U
Nickel	100	U	U	86.4	5.0B	5.2
Potassium	NC	1290B	1010	727	918B	1000
Selenium	50	U	U	U	U	U
Silver	NC	U	U	U	U	U
Sodium	50,000	21300	25700	21400J	13500	16400
Thallium	10	U	U	U	U	U
Vanadium	NC	U	U	U	U	U
Zinc	5000	R	U	733	R	61.3

U - not detected

J - estimated

B - concentration exceeds machine detection limits
 but not contract required detection limit.

NC- no criteria

NA - not analyzed

R - analysis not of useable quality

Shading indicates concentration exceeds
 N.J.A.C. 7:9-6.

TABLE 5-7
WITCO CORPORATION
PERTH AMBOY, NEW JERSEY
SURFACE WATER QUALITY STANDARDS
(in ug/l)

COMPOUND/ANALYTE ¹	SURFACE WATER QUALITY STANDARDS ²
Acetone	NC
1,1-Dichloroethane	NC
Cis-1,2-Dichloroethene	NC
Toluene	50*(a)
Ethylbenzene	50*(a)
Xylene	NC
Bis(2-ethylhexyl)phthalate	5(a)
Total Petroleum Hydrocarbons	NC
Aluminum	NC
Antimony	12.2
Arsenic	0.017
Barium	2000
Beryllium	NC
Calcium	NC
Chromium	160
Cobalt	NC
Copper	NC
Lead	5
Magnesium	NC
Manganese	NC
Nickel	516
Potassium	NC
Silver	164
Sodium	NC
Vanadium	NC
Zinc	NC

1- Only compounds detected in samples listed.

2- From January 30, 1997 NJDEP, Subject Surface Water Quality Standards.

(a)- Site-specific standard.

* - Combination ethylbenzene/toluene/naphthalene.

TABLE 5-8
WITCO CORPORATION
PERTH AMBOY, N. J.

VOLATILE ORGANIC COMPOUNDS, BASE/NEUTRAL/ACID EXTRACTABLE ORGANIC COMPOUNDS

AND TPH IN SURFACE WATER SAMPLES (in $\mu\text{g/l}$)

JUNE1995 - JUNE 1998

Sample Number	Surface Water	SW-001	SW-001	SW-001	SW-001	SW-002	SW-002	SW-002	SW-002	SW-003	SW-003	SW-003	SW-003	SW-004	SW-004	SW-004	SW-004
Sample Date	Quality Criteria ($\mu\text{g/L}$)	6/5/95	6/14/96	6/26/97	6/19/98	6/5/95	6/14/96	6/26/97	6/19/98	6/5/95	6/14/96	6/26/97	6/19/98	6/5/95	6/14/96	6/26/97	6/19/98
Parameter																	
Volatile Organic Compounds (GC/MS)																	
Acetone	NC	6.6J	5.2	U	U	8.4J	U	U	U	6.2J	15	U	U	6.2J	U	U	U
1,1-Dichloroethane	NC	U	U	U	0.5	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	NC	U	U	U	U	U	1.4	U	U	U	U	U	U	U	2.5	U	U
Toluene	(a)	U	0.4	U	U	U	U	U	U	U	0.5	U	U	U	U	U	U
Ethylbenzene	(a)	U	U	U	U	U	U	U	U	U	0.3	U	U	U	U	U	U
Xylene (total)	NC	U	1.1	U	U	U	U	U	U	U	1.9	U	U	U	U	U	U
Total VOCs (Js excluded)		U	6.7	U	0.5	U	1.4	U	U	U	17.7	U	U	U	2.5	U	U
Total VOCs (Js included)			6.6J	6.7	U	0.5	8.4J	1.4	U	U	6.2J	17.7	U	U	6.2J	2.5	U
TICs (estimated)				U	U	U	U	U	U	U	U	U	U	U	U	U	U
Total VOCs (Js and TICs included)				6.6J	6.7	U	0.5	8.4J	1.4	U	U	6.2J	17.7	U	U	6.2J	2.5
TCL Base/ Neutral & Acid Extractable Organic Compounds																	
bis(2-Ethylhexyl)phthalate	5	U	U	U	U	U	U	U	U	1.3J	U	1700	U	U	U	U	U
Total Semi-VOCs (Js excluded)		U	U	U	U	U	U	U	U	U	U	1700	U	U	U	U	U
Total Semi-VOCs (Js included)		U	U	U	U	U	U	U	U	1.3J	U	1700	U	U	U	U	U
TICs (estimated)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Total Semi-VOCs (Js and TICs included)		U	U	U	U	U	U	U	U	1.3J	U	1700	U	U	U	U	U
Total Petroleum Hydrocarbons (TPH)																	
TPH	NC	U	U	U	U	U	U	U	U	0.6	U	U	U	U	U	U	U

U-not detected

J - estimated.

NC-no criteria

N - the spiked sample recovery is not within control limits

(a) the sum of Toluene, Ethylbenzene, & Naphthalene shall not exceed 50 ug/L.

Shading indicates concentration exceeds NJ Standard.

TABLE 5-9
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS IN SURFACE WATER SAMPLES (in $\mu\text{g/l}$)
 June 1995 - June 1998

SAMPLE NUMBER SAMPLE DATE	Surface Water Quality Criteria ($\mu\text{g/l}$)	SW-001 6/5/95	SW-001 6/14/96	SW-001 6/26/97	SW-001 6/19/98	SW-002 6/5/95	SW-002 6/14/96
PARAMETER							
TOTAL METALS							
Aluminum	NC	NA	253	200	113	NA	442
Antimony	12.2(h) ^{NJ}	U	U	U	U	U	3.6
Arsenic	0.017(d) ^{NJ}	U	U	U	U	U	U
Barium	2000(h)	NA	53	49.5B	54.5	NA	59.3
Beryllium	NC	U	U	0.3B	0.26	U	U
Calcium	NC	NA	42800	56800	507000	NA	43700
Chromium	160(h) ^{NJ}	U	U	UJ	U	U	U
Cobalt	NC	NA	10.7	49.1B	30	NA	2.6
Copper	NC	U	8.4	U	U	U	9.9
Iron	NC	NA	3720	4690	2420	NA	4130
Lead	5(h) ^{NJ}	U	U	U	U	U	3.2
Magnesium	NC	NA	8630	15400	11900	NA	7910
Manganese	NC	NA	886	1920	1390	NA	762
Nickel	516(h) ^{NJ}	U	18	68.2	38.3	U	7.5
Potassium	NC	NA	3730	2810B	2650	NA	4480
Silver	164(h) ^{NJ}	U	U	U	U	U	U
Sodium	NC	NA	65900	80100J	55000	NA	50300
Vanadium	NC	NA	U	U	U	NA	1.8
Zinc	NC	95	48.3	145	106	45	29.3

Superscripts- ^{NJ}- New Jersey Surface Water Standard; ^{EPA}- EPA Standard currently applicable to NJ surface waters

Qualifiers- (h)- noncarcinogenic effect-based human health criteria; (hc)- human carcinogenic effect-based human health criteria

Only analytes detected reported

U - not detected

J - estimated

B - concentration between method detection limit and instrument detection limit

NC - no criteria

NA-not analyzed

Shading indicates concentration exceeds surface water quality standards applicable to New Jersey surface waters for human health.

TABLE 5-9
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS IN SURFACE WATER SAMPLES (in $\mu\text{g/l}$)
 June 1995 - June 1998

SAMPLE NUMBER SAMPLE DATE	Surface Water Quality Criteria ($\mu\text{g/l}$)	SW-002 6/26/97	SW-002 6/19/98	SW-003 6/5/95	SW-003 6/14/96	SW-003 6/26/97	SW-003 6/19/98
PARAMETER							
TOTAL METALS							
Aluminum	NC	161B	100	NA	992	3150	125
Antimony	12.2(h) ^{NJ}	U	U	U	9	6.8B	U
Arsenic	0.017(d) ^{NJ}	U	U	U	U	9.6B	U
Barium	2000(h)	51B	55	NA	38.1	137B	31.8
Beryllium	NC	0.2B	U	U	U	U	U
Calcium	NC	55400	44000	NA	39300	65100	40600
Chromium	160(h) ^{NJ}	UJ	U	U	U	8.2BJ	1.3
Cobalt	NC	43.3B	U	NA	2.2	9B	1.4
Copper	NC	U	5.1	U	12.3	47.4	5.9
Iron	NC	4300	4790	NA	4250	200000	6780
Lead	5(h) ^{NJ}	U	U	U	U	35.3	U
Magnesium	NC	14800	8110	NA	5570	14500	6690
Manganese	NC	1760	778	NA	622	3340	958
Nickel	516(h) ^{NJ}	57.2	3.1	U	9.2	16.3B	3.2
Potassium	NC	2760B	3360	NA	7530J	7770	4660
Silver	164(h) ^{NJ}	U	U	U	U	1.1B	U
Sodium	NC	74000J	37600	NA	48100	88100J	40700
Vanadium	NC	U	U	NA	3.6	19.5B	U
Zinc	NC	129J	18.3	40	31.8	176	17.8

Superscripts- ^{NJ}- New Jersey Surface Water Standard; ^{EPA}- E

Qualifiers- (h)- noncarcinogenic effect-based human health crit

Only analytes detected reported

U - not detected

J - estimated

B - concentration between method detection limit and instrume

NC - no criteria

NA-not analyzed

Shading indicates concentration exceeds surface water quality

TABLE 5-9
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 TOTAL INORGANICS IN SURFACE WATER SAMPLES (in $\mu\text{g/l}$)
 June 1995 - June 1998

SAMPLE NUMBER SAMPLE DATE	Surface Water Quality Criteria ($\mu\text{g/l}$)	SW-004 6/5/95	SW-004 6/14/96	SW-004 6/26/97	SW-004 6/19/98
PARAMETER					
TOTAL METALS					
Aluminum	NC	NA	319	136B	99.2
Antimony	12.2(h) ^{NJ}	U	U	U	U
Arsenic	0.017(d) ^{NJ}	U	U	U	U
Barium	2000(h)	NA	69.6	82.9B	76.5
Beryllium	NC	U	U	U	U
Calcium	NC	NA	44400	52600	46000
Chromium	160(h) ^{NJ}	U	U	UJ	U
Cobalt	NC	NA	1.5	U	U
Copper	NC	U	9.7	4.2B	5.9
Iron	NC	NA	4210	2650	3330
Lead	5(h) ^{NJ}	U	4.8	7.3	3.2
Magnesium	NC	NA	8580	12600	9250
Manganese	NC	NA	796	788	686
Nickel	516(h) ^{NJ}	44	4.6	3.1B	2.5
Potassium	NC	NA	3110	2740B	2250
Silver	164(h) ^{NJ}	U	U	U	U
Sodium	NC	NA	47500	50500J	34500
Vanadium	NC	NA	U	U	U
Zinc	NC	110	23.9	38.9	25

Superscripts- ^{NJ} - New Jersey Surface Water Standard; ^{EPA} - E

Qualifiers- (h)- noncarcinogenic effect-based human health crit

Only analytes detected reported

U - not detected

J - estimated

B - concentration between method detection limit and instrume

NC - no criteria

NA-not analyzed

Shading indicates concentration exceeds surface water quality

TABLE 5-10
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS IN SURFACE WATER SAMPLES (in µg/l)
 June 1995 - June 1998

SAMPLE NUMBER SAMPLE DATE	Surface Water Quality Criteria (µg/L)	SW-001 6/5/95	SW-001 6/14/96	SW-001 6/26/97	SW-001 6/19/98	SW-002 6/5/95	SW-002 6/14/96
PARAMETER							
DISSOLVED METALS							
Aluminum	NC	NA	U	U	276	NA	84.8
Antimony	12.2(h) ^{NJ}	NA	U	U	U	NA	U
Barium	2000(h)	NA	57.1	50.1B	46.4	NA	72
Beryllium	NC	NA	U	0.22B	1.26	NA	U
Calcium	NC	NA	47200	57200	52400	NA	45000
Chromium	160(h) ^{NJ}	NA	U	1.4BJ	U	NA	U
Cobalt	NC	NA	8.4	48.7B	44.4	NA	2.4
Copper	NC	NA	3.9	U	U	NA	5.6
Iron	NC	NA	486	3980	4230	NA	804
Magnesium	NC	NA	9050	15400	13200	NA	8110
Manganese	NC	NA	885	1910	1750	NA	746
Nickel	516(h) ^{NJ}	NA	13.8	63.6	58.3	NA	6.6
Potassium	NC	NA	4370	2840B	2680	NA	4500
Sodium	NC	NA	66500	80400J	66200	NA	52800
Zinc	NC	NA	24.2	152	157	NA	17.4

Superscripts- ^{NJ}- New Jersey Surface Water Standard; ^{EPA}- EPA Standard currently applicable to NJ surface waters

Qualifiers- (h)- noncarcinogenic effect-based human health criteria; (hc)- human carcinogenic effect-based human health criteria

Only analytes detected reported

U - not detected

J - estimated

B - concentration between method detection limit and instrument detection limit

NC - no criteria

NA-not analyzed

Shading indicates concentration exceeds surface water quality standards applicable to New Jersey surface waters for human health.

TABLE 5-10
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS IN SURFACE WATER SAMPLES (in $\mu\text{g/l}$)
 June 1995 - June 1998

SAMPLE NUMBER SAMPLE DATE	Surface Water Quality Criteria ($\mu\text{g/L}$)	SW-002 6/26/97	SW-002 6/19/98	SW-003 6/5/95	SW-003 6/14/96	SW-003 6/26/97	SW-003 6/19/98
PARAMETER							
DISSOLVED METALS							
Aluminum	NC	U	U	NA	156	U	U
Antimony	12.2(h) ^{NJ}	U	U	NA	8.4	U	5.3
Barium	2000(h)	51.1B	53.6	NA	46.2	59.2B	30.8
Beryllium	NC	0.23B	U	NA	U	U	U
Calcium	NC	56200	45300	NA	39900	66000	40300
Chromium	160(h) ^{NJ}	1.1BJ	U	NA	U	UJ	U
Cobalt	NC	46B	1.9	NA	1.3	3.8B	4.2
Copper	NC	U	U	NA	4.7	U	U
Iron	NC	3900	1990	NA	U	9390	3950
Magnesium	NC	15100	8350	NA	5700	14600	6660
Manganese	NC	1830	799	NA	406	2830	951
Nickel	516(h) ^{NJ}	60.8	3.4	NA	7.9	5.7B	3.3
Potassium	NC	2730B	3470	NA	7400J	7950	4630
Sodium	NC	76600J	38800	NA	50500	9400	40600
Zinc	NC	169J	14.4	NA	U	20.2	16.4

Superscripts- ^{NJ}- New Jersey Surface Water Standard; ^{EPA}- E

Qualifiers- (h)- noncarcinogenic effect-based human health crit

Only analytes detected reported

U - not detected

J - estimated

B - concentration between method detection limit and instrument detection limit

NC - no criteria

NA-not analyzed

Shading indicates concentration exceeds surface water quality

TABLE 5-10
 WITCO CORPORATION
 PERTH AMBOY, NEW JERSEY
 DISSOLVED INORGANICS IN SURFACE WATER SAMPLES (in µg/l)
 June 1995 - June 1998

SAMPLE NUMBER SAMPLE DATE	Surface Water Quality Criteria (µg/L)	SW-004 6/5/95	SW-004 6/14/96	SW-004 6/26/97	SW-004 6/19/98
PARAMETER					
DISSOLVED METALS					
Aluminum	NC	NA	U	U	U
Antimony	12.2(h) ^{NJ}	NA	U	U	U
Barium	2000(h)	NA	86.6	86.1B	73.5
Beryllium	NC	NA	U	U	U
Calcium	NC	NA	47100	57400	47800
Chromium	160(h) ^{NJ}	NA	U	UJ	U
Cobalt	NC	NA	1.4	1.2B	3.6
Copper	NC	NA	4.3	U	U
Iron	NC	NA	748	825	305
Magnesium	NC	NA	9040	13700	9590
Manganese	NC	NA	820	855	723
Nickel	516(h) ^{NJ}	NA	4	3.4B	U
Potassium	NC	NA	3170	2970B	2350
Sodium	NC	NA	50800	55500J	36100
Zinc	NC	NA	20.9	28.1	13.6

Superscripts- ^{NJ}- New Jersey Surface Water Standard; ^{EPA}- E

Qualifiers- (h)- noncarcinogenic effect-based human health crit

Only analytes detected reported

U - not detected

J - estimated

B - concentration between method detection limit and instrume

NC - no criteria

NA-not analyzed

Shading indicates concentration exceeds surface water quality

FIGURE 5-3
WITCO CORPORATION
TCE and Total VOCs Plots Trend Plots
MW-1S

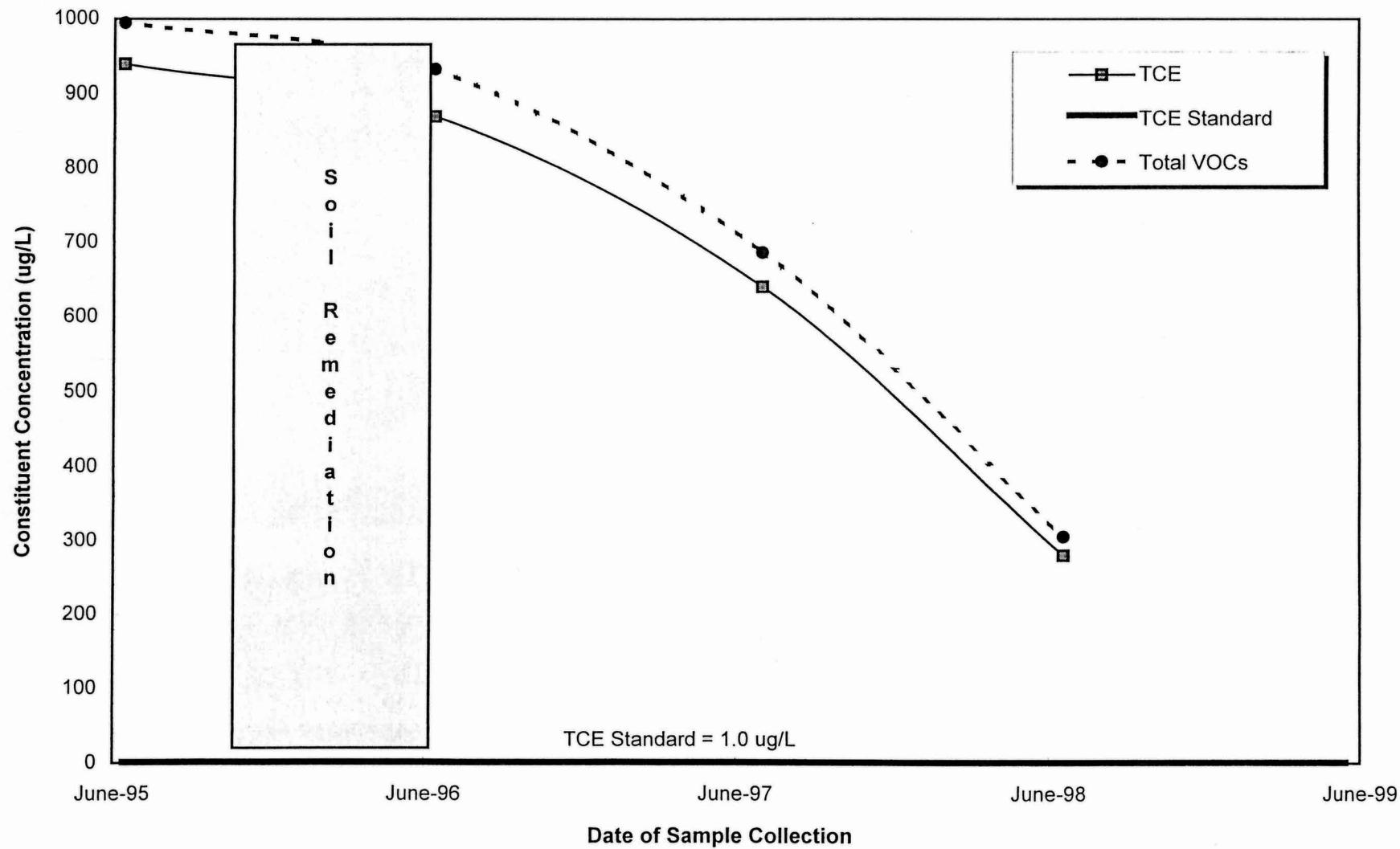


FIGURE 5-4
WITCO CORPORATION
1,1-DCE and cis-1,2-DCE Trend Plots
MW-1S

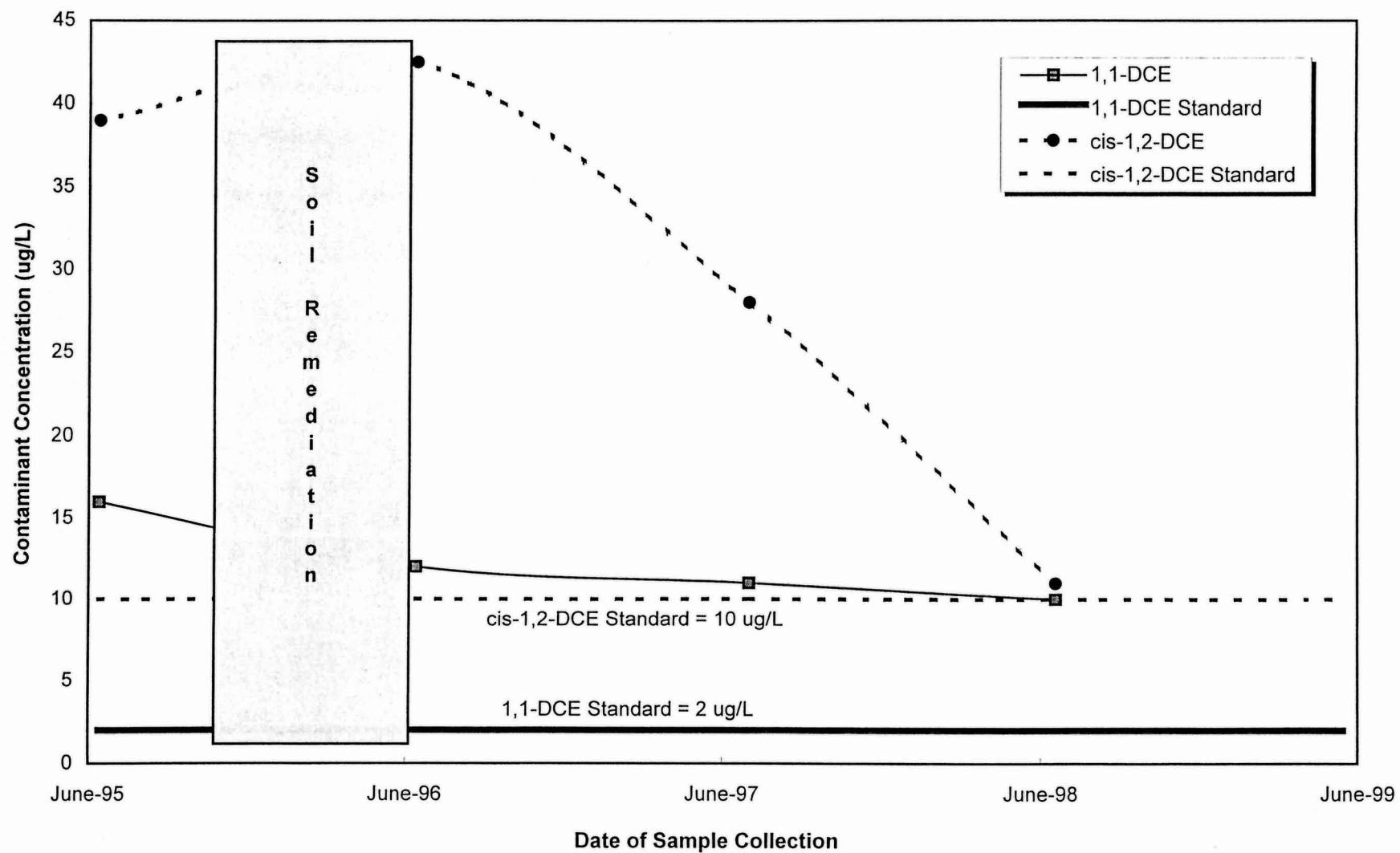


FIGURE 5-5
WITCO CORPORATION
Chloromethane Trend Plot
MW-6S

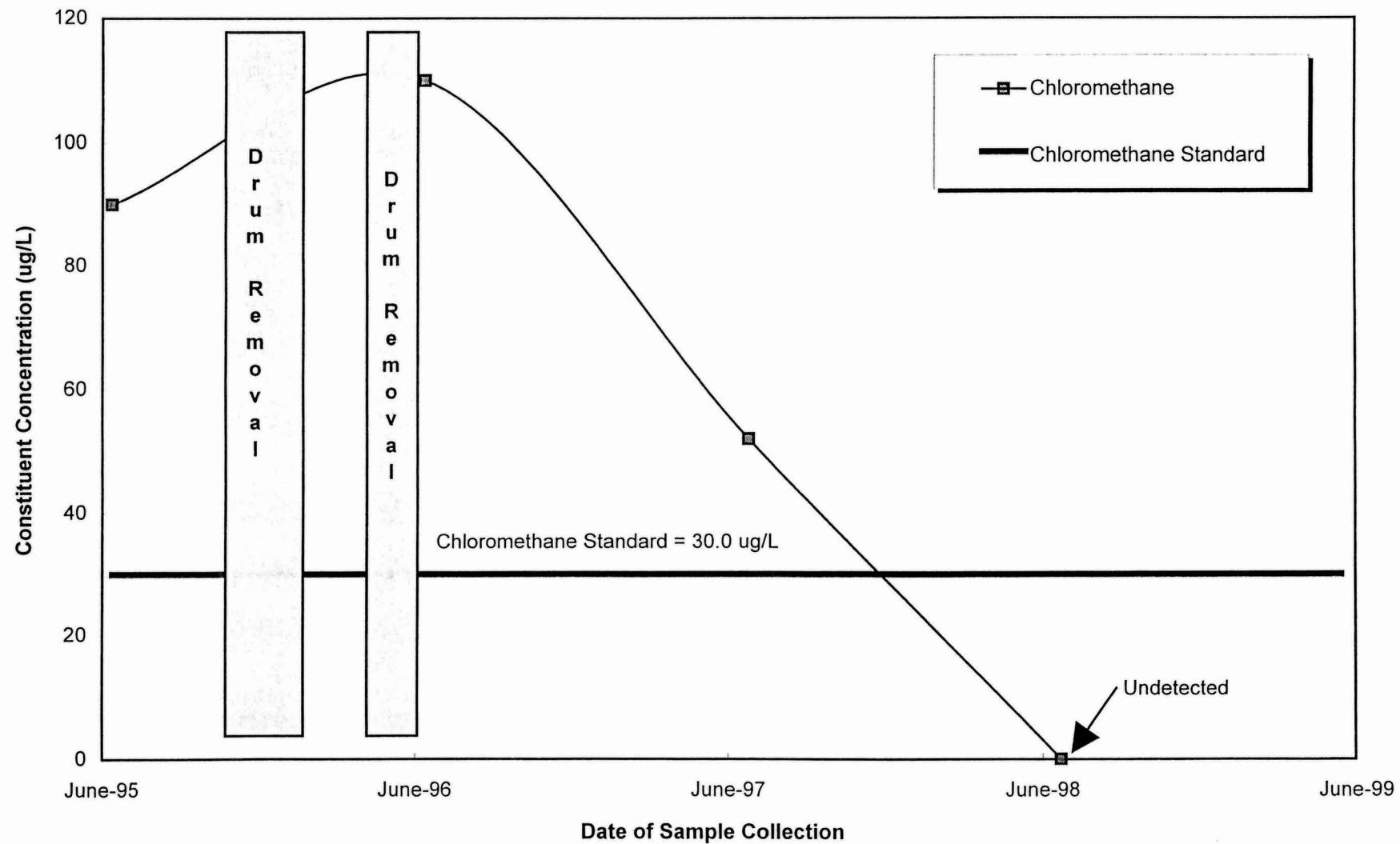


FIGURE 5-6
WITCO CORPORATION
Benzene Trend Plot
MW-6S

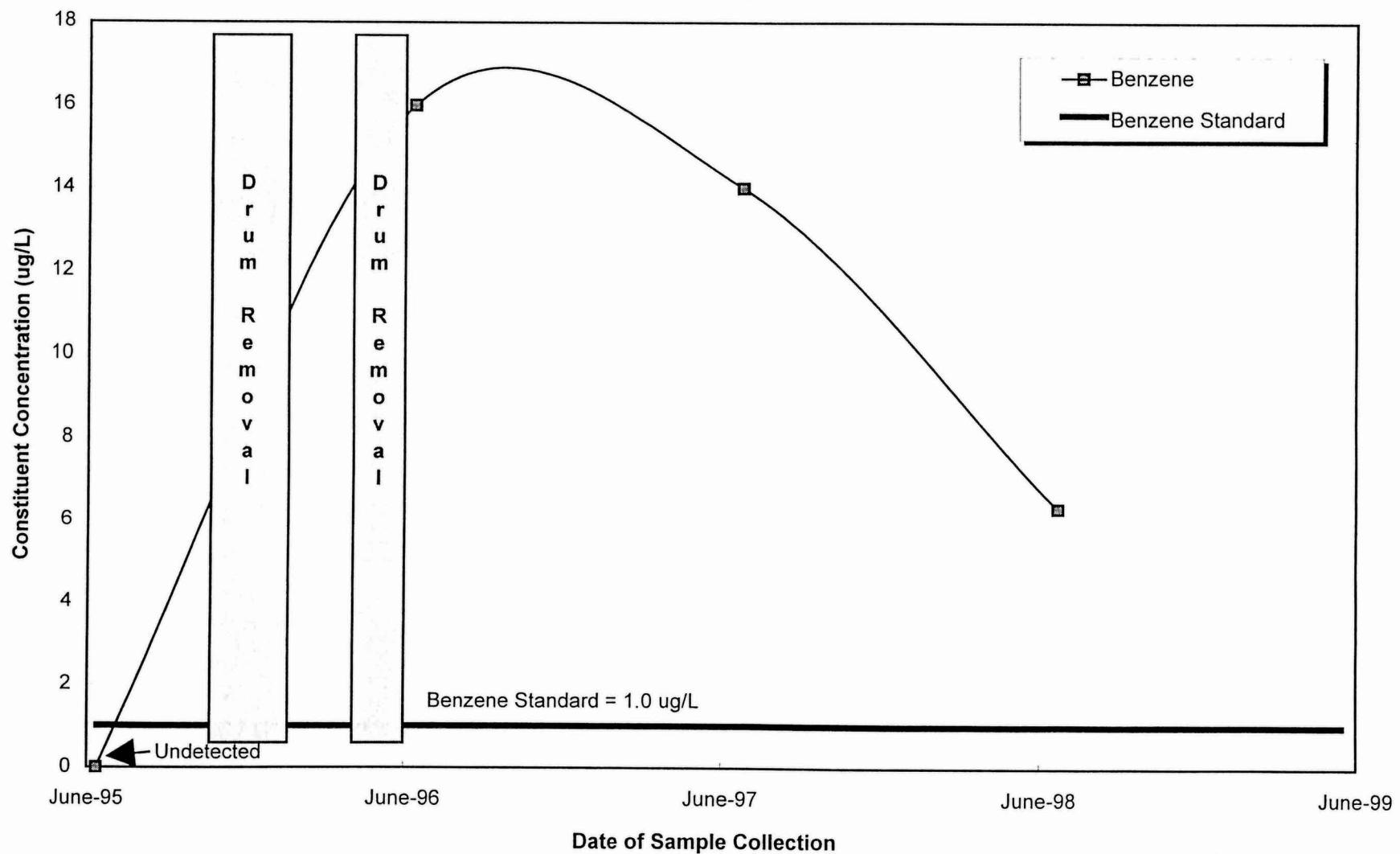


FIGURE 5-7
WITCO CORPORATION
Total VOCs Trend Plot
MW-6S

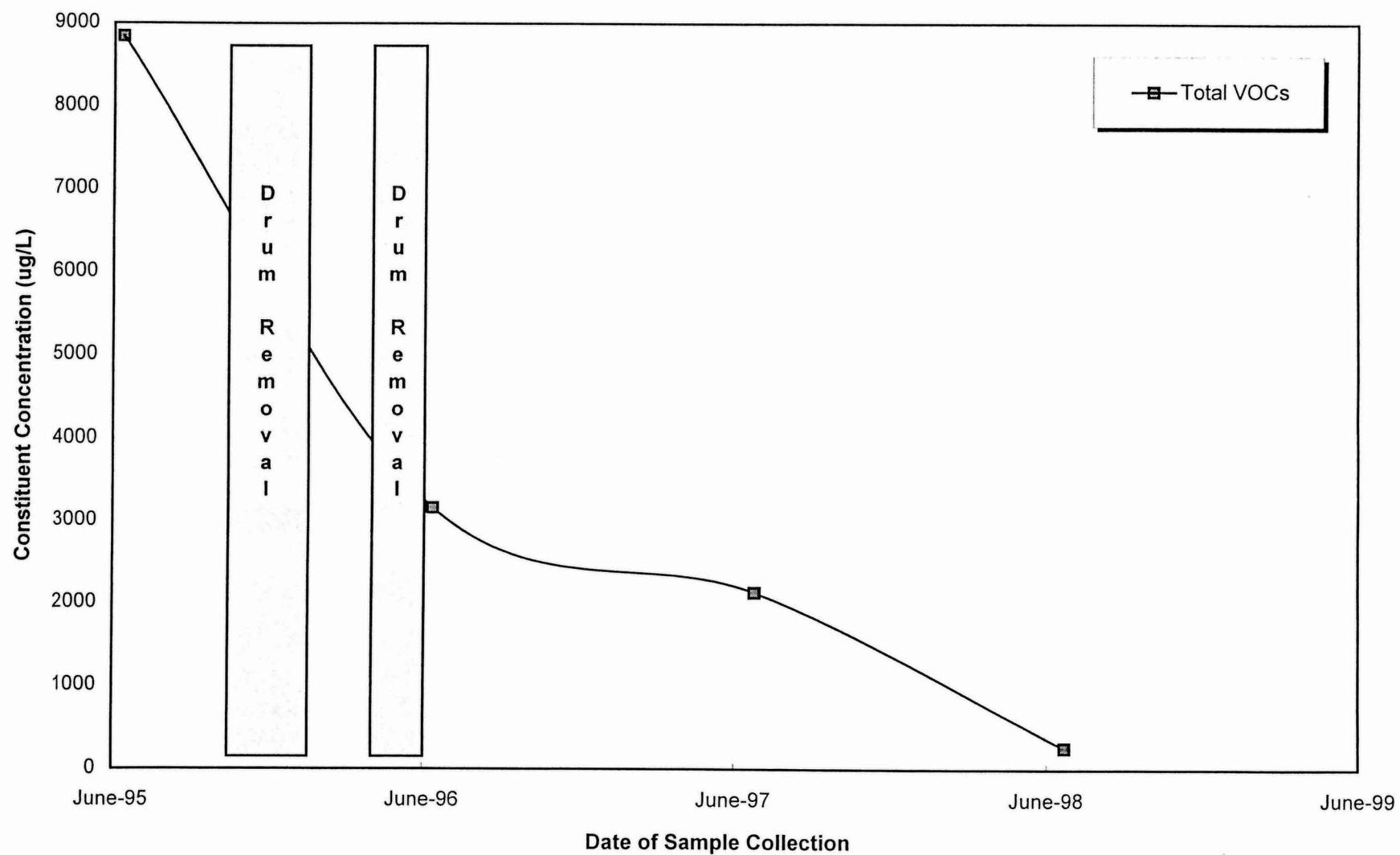


FIGURE 5-8
WITCO CORPORATION
Benzene Trend Plot
MW-11S

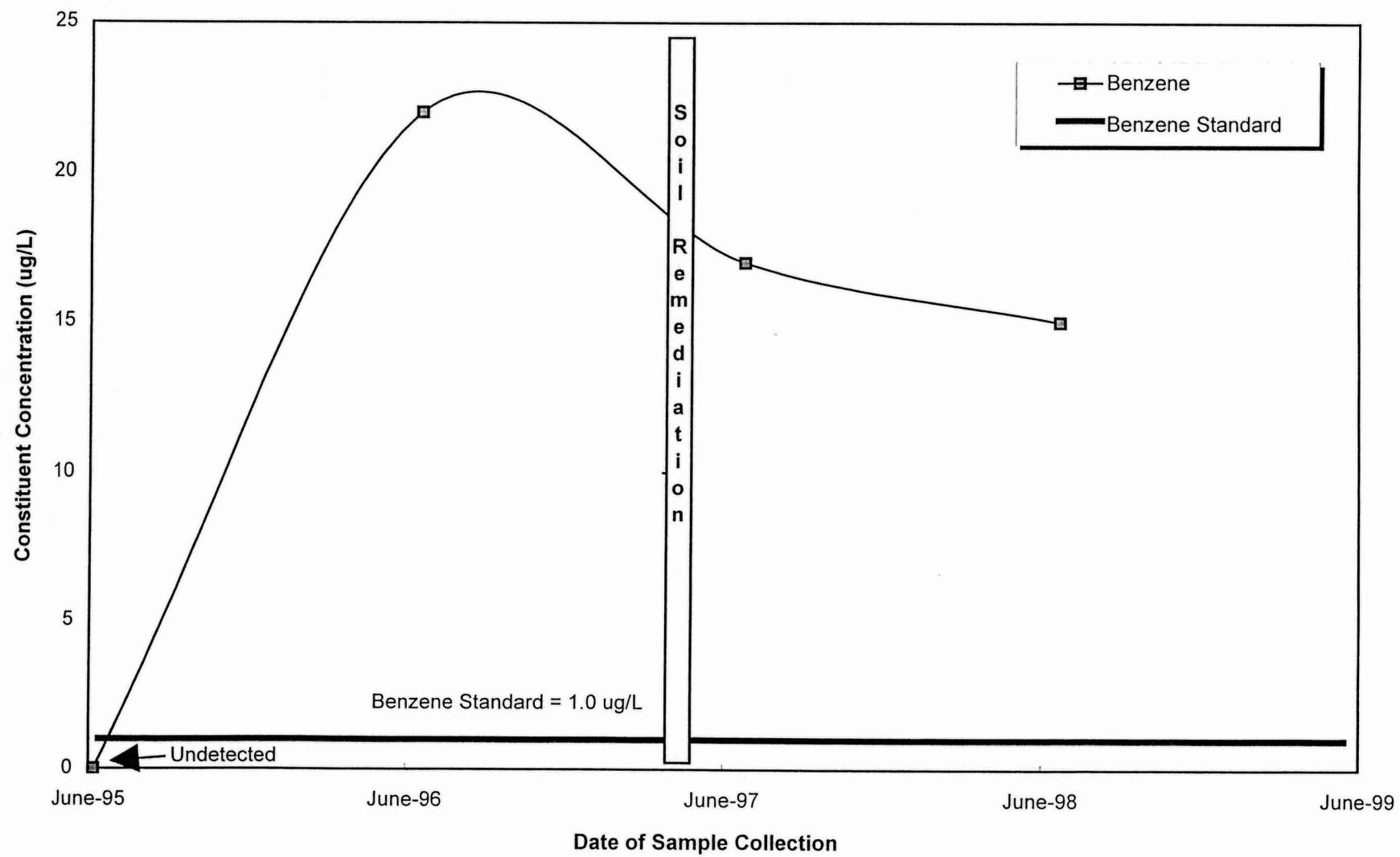


FIGURE 5-9
WITCO CORPORATION
Xylenes Trend Plot
MW-11S

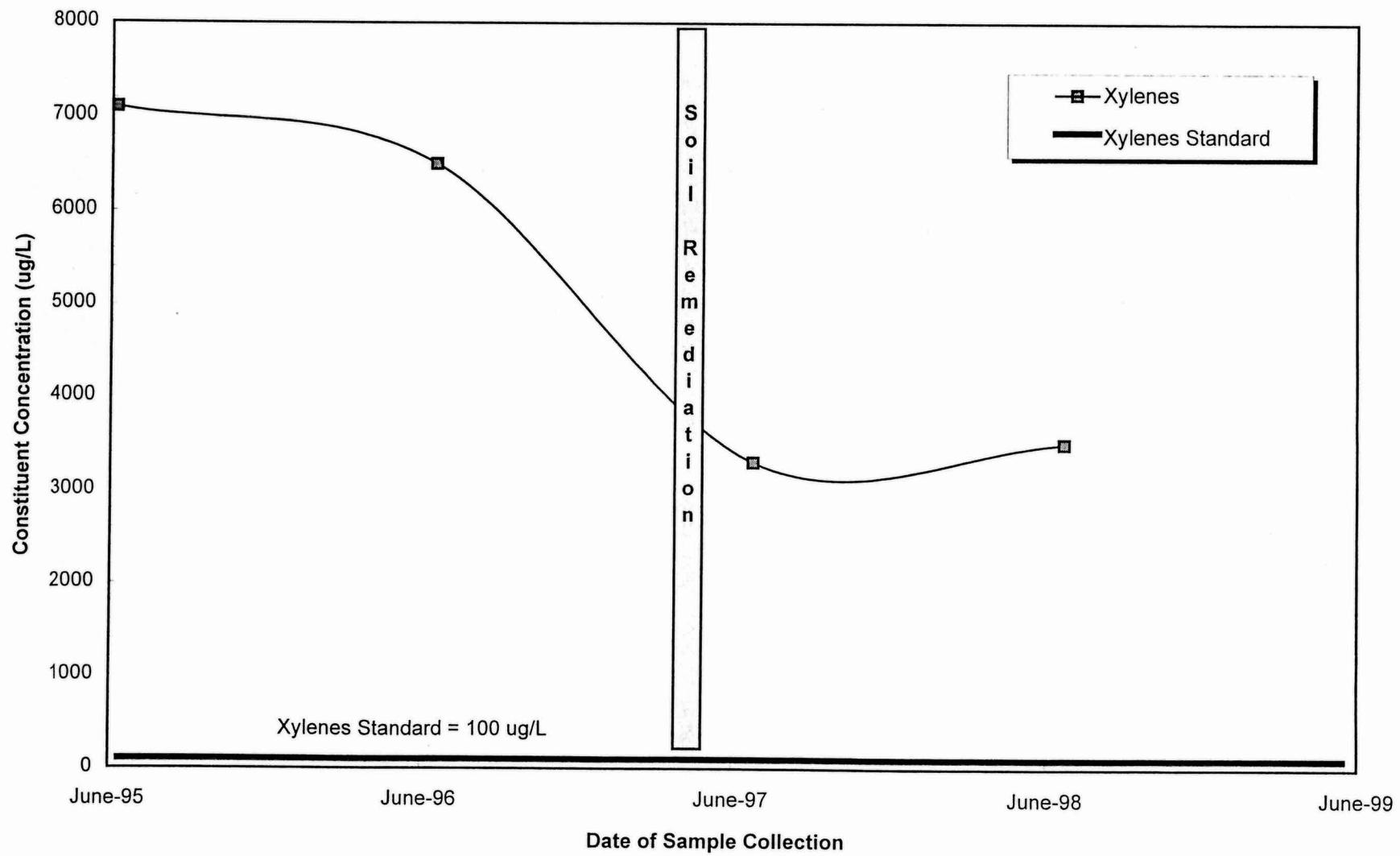


FIGURE 5-10
WITCO CORPORATION
Toluene, Ethylbenzene and Naphthalene Trend Plots
MW-11S

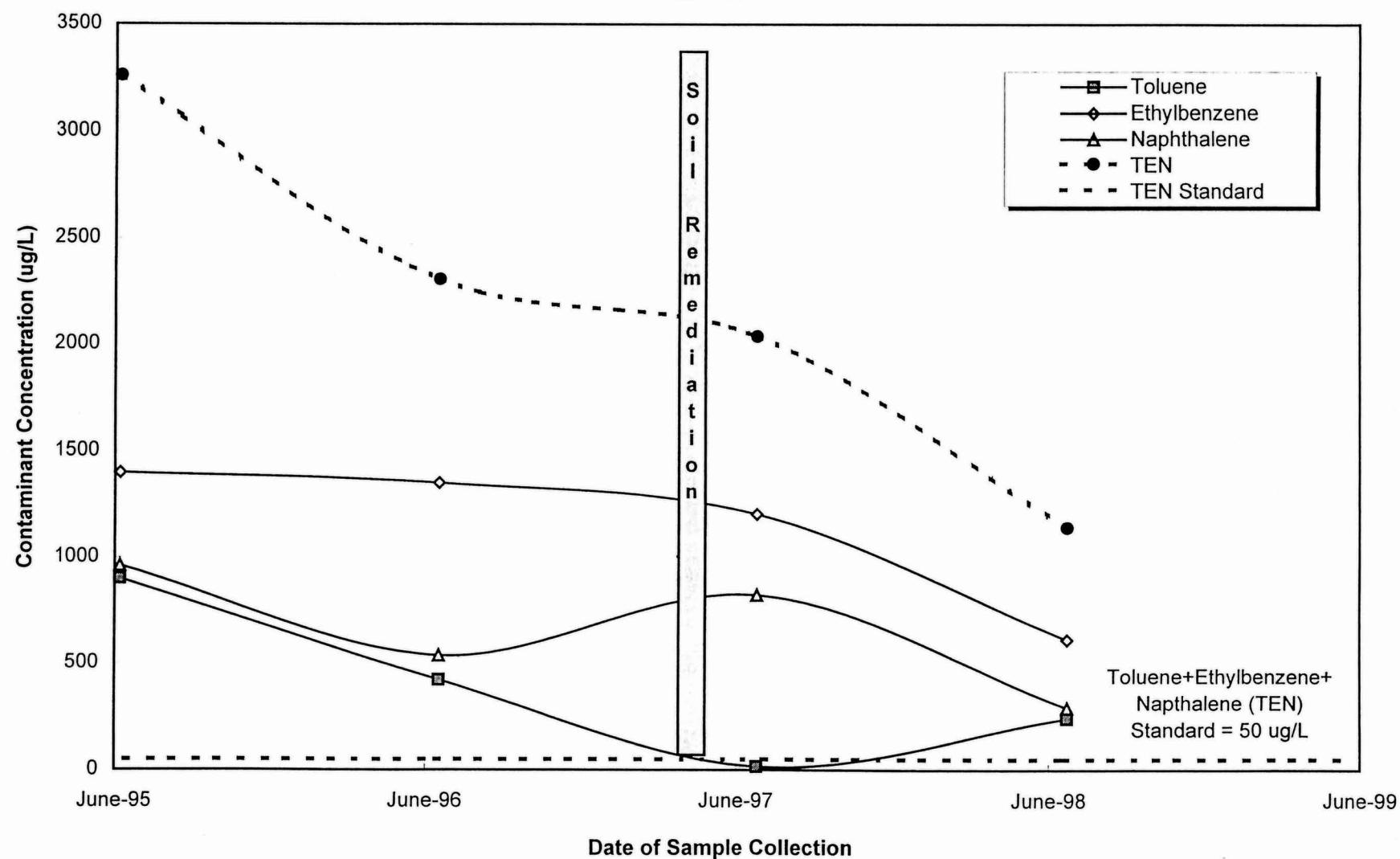
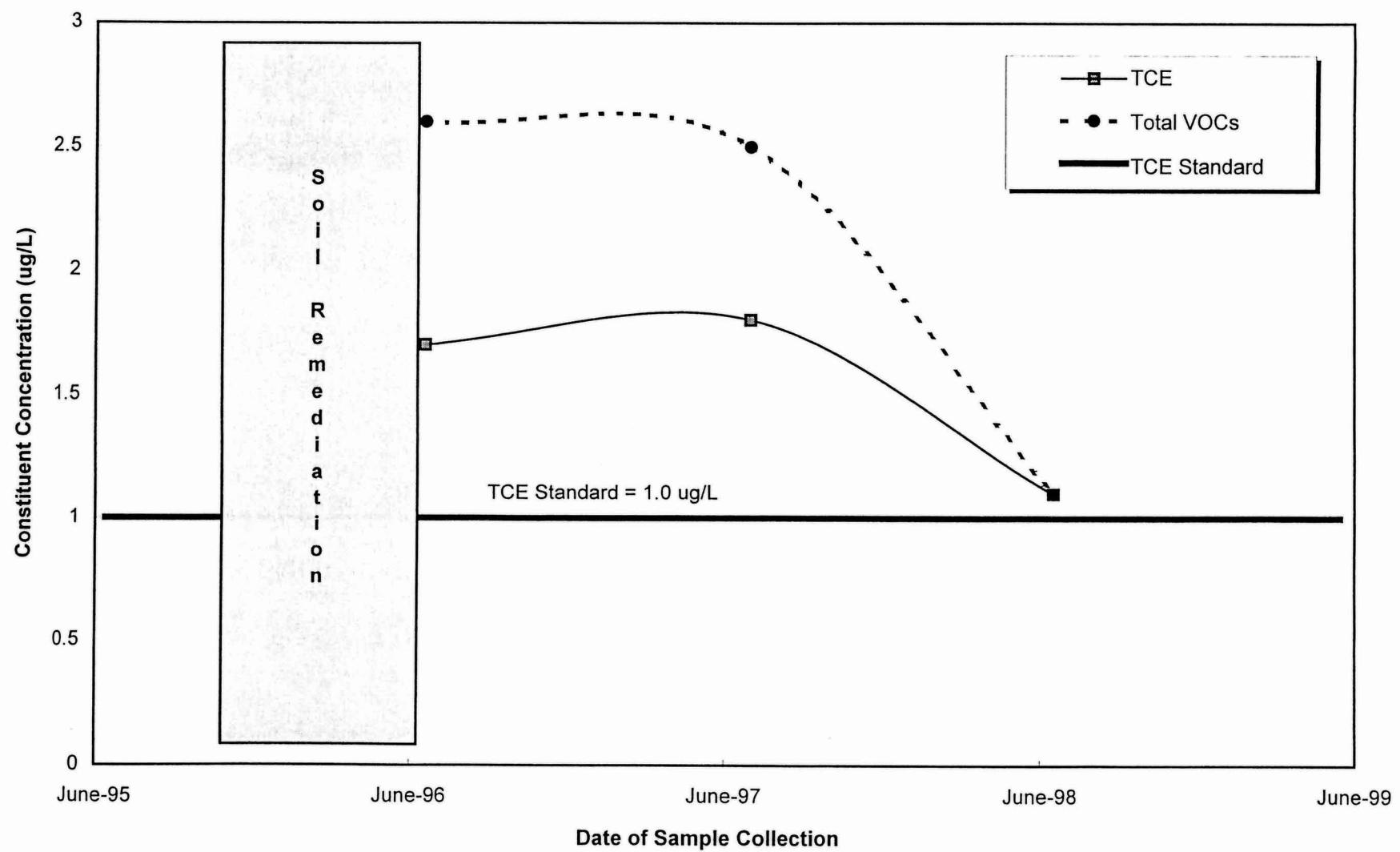


FIGURE 5-11
WITCO CORPORATION
TCE and Total VOCs Trend Plots
MW-14P



6.0 QUALITY ASSURANCE/QUALITY CONTROL

In order to generate analytical and field data of known and defensible quality, adherence to specific quality assurance protocols is necessary. Samples obtained must be representative of the particular matrix in order to meet program objectives. This section presents the QA/QC procedures and measures that were implemented during the remediation efforts.

6.1 Comparison of ENSYS Results to Method 8080 Results

One of the most important aspects of the sampling program implemented during the remedial action was the use of the bioassay screening kits and their correlation to the results of USEPA SW-846 Method 8080. Approximately 20 percent of the samples were submitted for Method 8080 analysis in addition to the ENSYS analysis. Table 6-1 presents the results for samples that were submitted for both ENSYS and Method 8080 analysis. The table identifies false negatives and false positives. As can be seen from the table, the correlation between the two analyses is favorable. A total of 181 samples were analyzed by both methods. Sixteen percent (29 samples) proved to be false positives, which did not compromise the remedial objectives since the ENSYS resulted in a higher value than that determined by Method 8080. Only six percent (11 samples) of the samples were false negatives.

6.2 Quality Assurance/Quality Control Samples

Field blanks and duplicates were utilized to assess the quality of the environmental samples collected and the technical performance of the analytical laboratory. Data qualification and validation were performed on the data.

6.2.1 Field Blanks

Field blanks were collected at the rate of one field blank per decontamination event. This was later modified to one field blank per every other decontamination event. Field blanks were collected by pouring laboratory supplied deionized water over decontaminated sampling equipment and collecting the rinsate in appropriate sample containers. The purpose of the field blank was to evaluate potential cross contamination from inadequate decontamination procedures. The chemical analysis selected for field blanks corresponded to the analyses of the environmental samples collected that day. Table 6-2 provides the results of the analysis of the field blanks collected during decontamination events. No detectable concentrations of PCBs were found in any of the field blanks collected.

6.2.2 Duplicates

Duplicate samples were collected to check on reproducibility of laboratory analytical data. Duplicate samples were collected from the same approximate depth and location, using the same piece(s) of sampling equipment for both samples. Post-excavation duplicate samples were not labeled as such, so as not to compromise the intended quality control function. Duplicates were collected for five percent of the samples and the results of the analysis are provided in Table 6-3.

Fifty-seven duplicate samples were collected. Four sets of duplicates were analyzed for both ENSYS and Method 8080 and all four correlated to each other. Only 5.3 percent (3 samples) of the duplicate samples failed to correspond to the result of the original sample.

6.3 Equipment Decontamination

In order to ensure the quality of the sample data generated during this remediation, equipment was decontaminated in accordance with the following procedures:

1. Brush or scrape off any gross contamination
2. Alconox and potable water wash
3. Potable water rinse
4. Deionized water rinse
5. Air dry
6. Wrap in aluminum foil

Field blanks were collected (as discussed in Section 6.2.1) to verify that equipment decontamination was completed to an acceptable degree.

6.4 Sample Documentation and Chain-of-Custody Procedure

All pertinent sampling information was recorded in a bound fieldbook. Sample labels were filled out and placed on sample containers prior to collection. After sample collection a chain-of-custody form was completed. This form accompanied the sample shipment to the laboratory.

6.5 Sample Packaging and Shipping

Samples were packed in a cooler with ice. All samples were sent to the laboratory within 24 hours of collection, usually within a few hours of collection. A courier from the laboratory performing the analyses picked up samples each afternoon. Occasionally there would be more than one sample pick-up a day.

TABLE 6-1
COMPARISON OF ENSYS TO METHOD 8080
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	TOTAL PCBs ENSYS	TOTAL PCBs 8080	AREA	EXCAV.
1	PE-SD-AA-01-02	<2	0.18	A	NT-E
2	PE-SD-AA-01-02D	<2	0.2	A	NT-E
3	PE-SD-AA-03-01	<2*	3.9	A	NT-E
4	PE-SD-AA-03-02	<2	0.31	A	NT-E
5	PE-SD-AA-13-02	>2-<50	2.5	A	NT-K
4	PE-SD-AA-14-01	>2-<50	4.1	A	NT-K
7	PE-HS1B-02	<2	U	B	HS1
8	PE-HS5-01	<2	U	B	HS5
9	PE-S-57-02	<2	1.3	C	T-5
10	PE-T-57-01	<2	U	C	T-5
11	PE-U-57-01	<2	0.28	C	T-5
12	PE-U-58-01	>2-<50	26	C	T-5
13	PE-T-45-01	<2	0.14	C	T-6
14	PE-U-44-01	<2	0.41	C	T-6
15	PE-U-45-02	<2	U	C	T-6
16	PE-U-45A-01	<2	U	C	T-6
17	PE-X-32-01	<2	U	C	T-7
18	PE-X-33-01	<2	U	C	T-7
19	PE-Y-32-01	<2	U	C	T-7
20	PE-Y-38-01	<2	2.4	C	T-9
21	PE-X-42-01	<2	U	C	NT-D
22	PE-Z-41-01	<2	U	C	NT-D
23	PE-Z-43-01	<2	U	C	NT-D
24	PE-M-55-01	<2	0.11	C	NT-F
25	PE-W-45-01	<2	U	C	NT-G
26	PE-V-44-01	<2	U	C	NT-G
27	VS-A1-04	<2	0.086	C	N-10
28	VS-A2-02	<2	U	C	N-10
29	VS-A3-01R	<2	0.81	C	N-10
30	VS-A3-03	<2	0.52	C	N-10
31	VS-A4-02	>50	5.6	C	N-10
32	VS-A4-03	<2	0.48	C	N-10
33	VS-A4-04	>50	65	C	N-10
34	VS-A5-02	<2	U	C	N-10
35	VS-A5-04	>50	5.5	C	N-10
36	VS-B1-01	<2	0.16	C	N-10
37	VS-B1-04	<2	0.16	C	N-10
38	VS-B3-03	>50	32	C	N-10
39	VS-B4-03	>50	20	C	N-10
40	VS-B5-02	<2	U	C	N-10
41	VS-C2-03	<2	0.22	C	N-10
42	VS-C3-01	<2	0.12	C	N-10
43	VS-C3-02	<2	0.11	C	N-10
44	VS-C4-02	>50	56	C	N-10

TABLE 6-1
COMPARISON OF ENSYS TO METHOD 8080
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	TOTAL PCBs ENSYS	TOTAL PCBs 8080	AREA	EXCAV.
45	VS-C4-04	>2-<50	2.7	C	N-10
46	VS-D2-01	>50	4	C	N-10
47	VS-D2-03	<2	0.39	C	N-10
48	VS-D3-01	<2	U	C	N-10
49	VS-D3-03	>50	5.4	C	N-10
50	VS-D5-03	<2	3	C	N-10
51	VS-D5-04	<2	0.19	C	N-10
52	PE-II-58-01	<2	0.83	D	T-1
53	PE-II-59-01	>50	0.22	D	T-1
54	PE-II-62-01	>50	110	D	T-1
55	PE-II-62-02	>2-<50	44	D	T-1
56	PE-II-64-01	<2	U	D	T-1
57	PE-JJ-58-01	<2	0.59	D	T-1
58	PE-JJ-61-03	>2-<50	0.76	D	T-1
59	PE-KK-61-01	>2-<50**	180	D	T-1
60	PE-KK-61-02	>50	69	D	T-1
61	PE-KK-61-03	>50	120	D	T-1
62	PE-KK-61-04	>50	190	D	T-1
63	PE-KK-61-05	>50	230	D	T-1
64	PE-KK-61-06	>50	3700	D	T-1
65	PE-KK-61-07	<2	0.2	D	T-1
66	PE-KK-62-01	>50	710	D	T-1
67	PE-LL-58-01	<2	0.83	D	T-1
68	PE-LL-60-01	>50	27	D	T-1
69	PE-LL-60-02	<2	U	D	T-1
70	PE-LL-61-01	>2-<50	1.6	D	T-1
71	PE-MM-59-01	<2	U	D	T-1
72	PE-MM-61-01	>50	92	D	T-1
73	PE-MM-61-02	<2	U	D	T-1
74	PE-MM-62-01	<2	0.19	D	T-1
75	PE-OO-57-01	<2	U	D	T-1
76	PE-PP-59-01	<2	U	D	T-1
77	PE-PP-60-01	<2	U	D	T-1
78	PE-PP-62-01	<2	0.1	D	T-1
79	PE-DD-60-01R	>2-<50	1.5	D	T-2
80	PE-DD-80-01R	>2-<50	1.6	D	T-2
81	PE-DD-61-01	<2	0.48	D	T-2
82	PE-DD-62-02	<2	U	D	T-2
83	PE-EE-59-01	<2	0.19	D	T-2
84	PE-EE-62-02	<2	U	D	T-2
85	PE-EE-63-01	<2	0.43	D	T-2
86	PE-II-54-01	<2	0.096	D	T-3
87	PE-II-84-01	<2	0.12	D	T-3
88	PE-CC-56-01	>2-<50	18	D	T-4
89	PE-DD-57-01	<2	U	D	T-4

TABLE 6-1
COMPARISON OF ENSYS TO METHOD 8080
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	TOTAL PCBs ENSYS	TOTAL PCBs 8080	AREA	EXCAV.
90	PE-DD-67-01	<2	U	D	T-4
91	PE-FF-56A-01	<2	0.27	D	T-4
92	PE-II-56-01	>2-<50	3.6	D	NT-A
93	PE-II-57-02	>50	43	D	NT-A
94	PE-II-57B-03	>2-<50	24	D	NT-A
95	PE-GG-56-01	<2	U	D	NT-B
96	PE-GG-61-01	<2	U	D	NT-C
97	PE-PP-22-01	>50	11	E	T-8
98	PE-LS-03	<2	U	E	LAG
99	PE-LL-27-01	<2	0.16	E	NT-H
100	PE-MM-29-01	<2	0.58	E	NT-H
101	PE-NN-26-01	<2	U	E	NT-H
102	PE-HH-29-01	<2	U	E	NT-J
103	PE-FF-34-01	<2	0.86	E	NT-M
104	PE-GG-33-01	<2	0.16	E	NT-M
105	PS-01C-01	<2	U	-	-
106	PS-01A-015	<2	U	-	-
107	PS-01B-015	<2	1.1	-	-
108	PS-01A-02B	<2	2.8	-	-
109	PS-01A-03	<2	0.47	-	-
110	PS-02-01	<2	U	-	-
111	PS-02A-02	<2	U	-	-
112	PS-04-00	>2-<50	0.81	-	-
113	PS-04A-02	<2	0.086	-	-
114	PS-04A-03	<2	0.12	-	-
115	PS-05-02	>2-<50	5.3	-	-
116	PS-05-03	<2	0.45	-	-
117	PS-05A-05	<2	U	-	-
118	PS-07-015	<2	U	-	-
119	PS-07-02	<2	U	-	-
120	PS-07A-04	<2	U	-	-
121	PS-08-01	<2	0.13	-	-
122	PS-08A-05	<2	U	-	-
123	PS-09A-06	<2	U	-	-
124	PS-11A-04	<2	0.53	-	-
125	PS-14-01	<2	U	-	-
126	PS-15-00	>2-<50	0.75	-	-
127	PS-15-015	<2	1.6	-	-
128	PS-15A-025	<2	0.61	-	-
129	PS-15B-05	>2-<50	5.9	-	-
130	PS-18-01	<2	0.16	-	-
131	PS-20A-06	<2	U	-	-
132	PS-22-01	<2	0.58	-	-
133	PS-25-01	>50	1.7	-	-

TABLE 6-1
COMPARISON OF ENSYS TO METHOD 8080
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	TOTAL PCBs ENSYS	TOTAL PCBs 8080	AREA	EXCAV.
134	PS-26-00	>2-<50	4	-	-
135	PS-26-01	>2-<50	3.4	-	-
136	SP-E-05	>50	160	-	-
137	SP-E-06	>50	420	-	-
138	SP-E-C-01	<2	0.13	-	-
139	SP-05-01	>50	380	-	-
140	SP-06-01	>2-<50	7.8	-	-
141	SP-12-01	>2-<50	1.3	-	-
142	SP-14-01	<2	0.22	-	-
143	SP-19-01	>50	5000	-	-
144	SP-20-01	>2-<50	4.3	-	-
145	SP-30-02	>2-<50	7.5	-	-
146	SP-33A-01	>50	180	-	-
147	SP-33B-01	>2-<50	110	-	-
148	SP-33C-01	>50	66	-	-
149	SP-36-01	>50	26	-	-
150	SP-36-02	>50	87	-	-
151	SP-36-03	>50	37	-	-
152	SP-36-04	>50	90	-	-
153	SP-TP11-01-01	>50	40	-	-
154	SP-TP11-01-02	>50	23	-	-
155	SP-TP11-02-01	>50	160	-	-
156	SP-TP11-02-02	>50	140	-	-
157	SP-TP11-02-03	>50	150	-	-
158	SP-TP11-03-02	>50	5.2	-	-
159	SP-TP11-03-03	>50	8.6	-	-
160	SP-TP11-04-01	>50	55	-	-
161	SP-TP11-04-02	>50	38	-	-
162	SP-TP11-04-03	>50	24	-	-
163	SP-TP11-04-05	>50	8.2	-	-
164	AP-1C-01	<2	0.36	-	-
165	AP-1D-01	>50**	13	-	-
166	AP-2A-01	<2	0.74	-	-
167	AP-3B-01	<2	0.25	-	-
168	AP-05-01	>2-<50	3.4	-	-
169	AP-05-AG	<2	U	-	-
170	AP-13-01	>50	5.6	-	-
171	AP-16-01	>2-<50	8.4	-	-
172	AP-23-01	<2	2.6	-	-
173	AP-26-01	>2-<50	5.1	-	-
174	AP-30-01	>2-<50	2.1	-	-
175	EO-A1-01	<2	5.1	-	-
176	EO-B1-02	>2-<50	6.8	-	-
177	EO-B2-01	<2	3	-	-
178	EO-B2-01R	<2	1.3	-	-

TABLE 6-1
COMPARISON OF ENSYS TO METHOD 8080
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	TOTAL PCBs ENSYS	TOTAL PCBs 8080	AREA	EXCAV.
179	EO-B3-01	>50	10	-	-
180	EO-C2-01	<2	3.4	-	-
181	STK-SD-02	>50	110	-	-

AS PER LAB REPORT:

* - CLOSE TO 2 PPM

** - CLOSE TO 50 PPM

U - UNDETECTED

EXCAV. - EXCAVATION ID

SHADED CELL INDICATES FALSE NEGATIVE.
 BOLD LETTERING INDICATES FALSE POSITIVE.

TABLE 6-2
FIELD BLANK ANALYSIS
WITCO CORPORATION
PERTH AMBOY FACILITY

SAMPLE DESIGNATIONS	TOTAL PCBs ENSYS	TOTAL PCBs 8080
Field Blank (9/20/95)	<2	
FB 102695		U
FB103195		U
FB-PS-110295-01*		U
FB-PS-110395-01		U
FB111095-03		U
PE-FB-113095		U
FB-010496		U
FB-032296-PS		U
WC-FB-062096		U

* - ADDITIONAL ANALYSIS RESULTS BELOW

FIELD BLANK FB-PS-110295-01

ANALYTICAL PARAMETERS	CONCENTRATION (mg/l)
VOCs	U
SVOCs	U
CALCIUM	0.148
LEAD	0.0029
MANGANESE	0.00031
SODIUM	0.381
ZINC	0.0052
CYANIDE	U

U - UNDETECTED

TABLE 6-3
DUPLICATE SAMPLE RESULTS
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	DATE	TIME	TOTAL PCBs ENSYS	TOTAL PCBs 8080	REMARKS	AREA	EXCAV.
1	PE-SD-AA-01-02	12/18/95	0840	<2	0.18	AFTER REEXCAV.	A	NT-E
	PE-SD-AA-01-02D	12/18/95	0840	<2	0.2	DUP OF AA-01-02	A	NT-E
2	PE-HS4-01	2/2/96	1045	<2			B	HS4
	PE-HS4-01D	2/2/96	1045	<2		DUP OF HS4-01	B	HS4
3	PE-S-57-01	2/12/96	1438	>50**			C	T-5
	PE-S-97-01	2/12/96	1438	>50**		DUP OF S-57-01	C	T-5
4	PE-S-58-01	2/9/96	0817	<2			C	T-5
	PE-S-98-01	2/9/96	0821	<2		DUP OF S-58-01	C	T-5
5	PE-Y-33-01	2/1/96	1000	<2			C	T-7
	PE-Y-83-01	2/1/96	1000	<2		DUP OF Y-33-01	C	T-7
6	PE-Y-34-01	11/6/95	1310	<2			C	T-7
	PE-Y-68-01	11/6/95	1310	<2		DUP OF Y-34-01	C	T-7
7	PE-X-37-01	3/7/96	1105	<2			C	T-9
	PE-X-97-01	3/7/96	1105	<2		DUP OF X-37-01	C	T-9
8	PE-N-54-01	3/5/96	1000	<2			C	NT-F
	PE-N-94-01	3/5/96	1000	<2		DUP OF N-54-01	C	NT-F
9	PE-O-55-01	3/5/96	0950	<2			C	NT-F
	PE-O-95-01	3/5/96	0950	<2		DUP OF O-55-01	C	NT-F
10	PE-V-45-01	2/6/96	1600	<2			C	NT-G
	PE-V-85-01	2/6/96	1600	<2		DUP OF V-45-01	C	NT-G
11	PE-W-44-01	2/8/96	1334	<2			C	NT-G
	PE-W-84-01	2/8/96	1340	<2		DUP OF W-44-01	C	NT-G
12	VS-A1-02	2/21/96	1345	>50			C	N-10
	VS-E1-02	2/21/96	1345	>50**		DUP OF VS-A1-02	C	N-10
13	VS-A2-02	2/21/96	1447	<2			C	N-10
	VS-E2-02	2/21/96	1447	<2		DUP OF VS-A2-02	C	N-10
14	VS-A3-01	3/11/96	1330	<2			C	N-10
	VS-F3-01	3/11/96	1330	>2-<50		DUP OF VS-A3-01	C	N-10
15	VS-B1-03	2/22/96	1100	<2			C	N-10
	VS-E1-03	2/22/96	1100	<2		DUP OF VS-B1-03	C	N-10
16	VS-B4-02	3/13/96	1312	<2			C	N-10
	VS-F4-02	3/13/96	1312	<2		DUP OF VS-B4-04	C	N-10
17	VS-C1-04	2/23/96	0925	<2			C	N-10
	VS-E1-04	2/23/96	0925	<2		DUP OF VS-C1-04	C	N-10
18	VS-C3-03	2/23/96	1040	<2			C	N-10
	VS-E3-03	2/23/96	1040	<2		DUP OF VS-C3-03	C	N-10
19	VS-D4-01	2/21/96	1005	<2			C	N-10
	VS-E4-01	2/21/96	1005	<2		DUP OF VS-D4-04	C	N-10
20	PE-KK-60-04	11/21/95	1345	>50		AFTER REEXCAV.	D	T-1
	PE-KK-80-04	11/21/95	1345	>50		DUP OF KK-60-04	D	T-1
21	PE-KK-60-05	1/29/96	1555	>2-<50		AFTER REEXCAV.	D	T-1
	PE-KK-90-05	1/29/96	1555	>2-<50		DUP OF KK-60-05	D	T-1

TABLE 6-3
DUPLICATE SAMPLE RESULTS
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

	SAMPLE ID	DATE	TIME	TOTAL PCBs ENSYS	TOTAL PCBs 8080	REMARKS	AREA	EXCAV.
22	PE-LL-63-01	10/31/95	1430	>50		DRUM REMOV AREA	D	T-1
	PE-LL-67-01	10/31/95	1430	>50		DUP OF LL-63-01	D	T-1
23	PE-NN-58-01	11/13/95	1330	<2			D	T-1
	PE-NN-78-01	11/13/95	1330	<2		DUP OF NN-58-01	D	T-1
24	PE-NN-60-01	2/23/96	1330	<2			D	T-1
	PE-NN-90-01	2/23/96	1330	<2		DUP OF NN-60-01	D	T-1
25	PE-NN-62-01	10/31/95	1415	<2			D	T-1
	PE-NN-68-01	10/31/95	1415	<2		DUP OF NN-62-01	D	T-1
26	PE-PP-57-01	2/27/96	1355	>2-<50			D	T-1
	PE-PP-97-01	2/27/96	1355	>2-<50		DUP OF PP-57-01	D	T-1
27	PE-DD-60-01R	1/25/96	1357	>2-<50	1.5	RESAMPLED GRID	D	T-2
	PE-DD-80-01R	1/25/96	1357	>2-<50	1.6	DUP OF DD-60-01R	D	T-2
28	PE-HH-53-01	12/1/96	1010	<2			D	T-3
	PE-HH-83-01	12/1/96	1010	<2		DUP OF HH-53-01	D	T-3
29	PE-II-54-01	12/8/95	0950	<2	0.096		D	T-3
	PE-II-84-01	12/8/95	0950	<2	0.12	DUP OF II-54-01	D	T-3
30	PE-DD-57-01	10/26/95	1355	<2	U		D	T-4
	PE-DD-67-01	10/26/95	1355	<2	U	DUP OF DD-57-01	D	T-4
31	PE-LL-57-02	11/14/95	0945	<2		AFTER REEXCAV.	D	NT-A
	PE-LL-77-02	11/14/95	0945	>2-<50*		DUP OF LL-57-01	D	NT-A
32	PE-GG-55-01	11/21/95	1435	<2			D	NT-B
	PE-GG-75-01	11/21/95	1435	<2		DUP OF GG-55-01	D	NT-B
33	PE-HH-61-01	10/25/95	1325	>2-<50			D	NT-C
	PE-HH-65-01	10/25/95	1325	>2-<50		DUP OF HH-61-01	D	NT-C
34	PE-LS-02	3/4/96	1438	<2			E	LAG
	PE-LS-04	3/4/96	1438	<2		DUP OF LS-02	E	LAG
35	PE-KK-27-01	1/4/96	1425	<2			E	NT-H
	PE-KK-87-01	1/4/96	1425	<2		DUP OF KK-27-01	E	NT-H
36	PE-NN-28-01	1/26/96	1048	<2			E	NT-H
	PE-NN-88-01	1/26/96	1048	>2-<50		DUP OF NN-28-01	E	NT-H
37	PE-HH-28-01	2/13/96	1137	<2			E	NT-I
	PE-HH-68-01	2/13/96	1137	<2		DUP OF HH-28-01	E	NT-I
38	PE-FF-32-01	3/5/96	1343	<2			E	NT-M
	PE-FF-92-01	3/5/96	1343	<2		DUP FF-32-01	E	NT-M
39	PS-03-02	1/24/96	1100	<2			-	-
	PS-03-02D	1/24/96	1100	<2		DUP OF PS-03-02	-	-
40	PS-04A-03	2/2/96	1510	<2	0.12		-	-
	PS-04A-03D	2/2/96	1510	<2		DUP OF PS-04-03	-	-
41	PS-04A-04	2/22/96	1125	<2			-	-
	PS-04A-04D	2/22/96	1125	<2		DUP OF PS-04A-04	-	-
42	PS-08-03	1/3/96	1140	<2			-	-
	PS-08-03D	1/3/96	1140	<2		DUP OF PS-08-03	-	-

TABLE 6-3
DUPLICATE SAMPLE RESULTS
WITCO CORPORATION
PERTH AMBOY FACILITY
(in mg/kg)

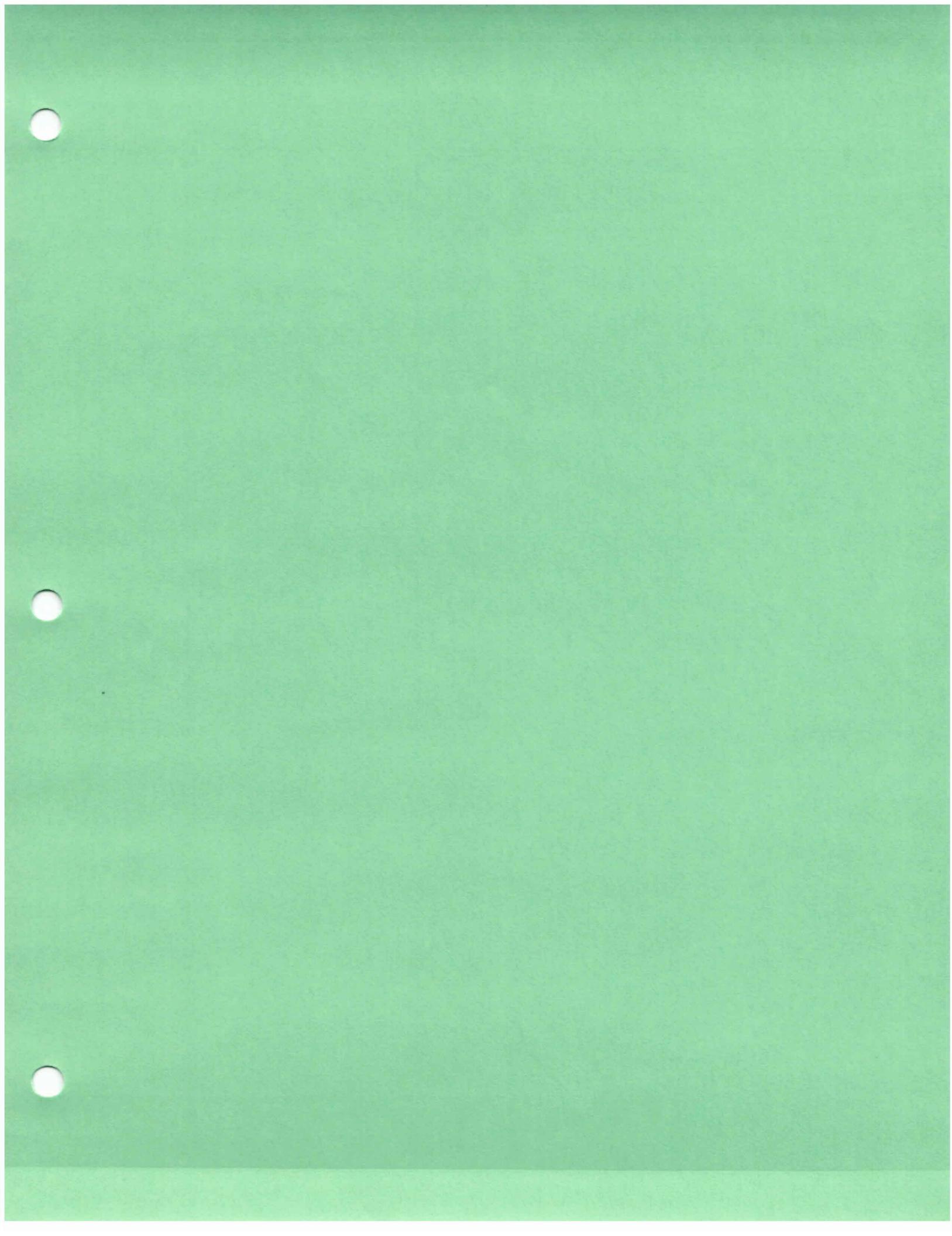
	SAMPLE ID	DATE	TIME	TOTAL PCBs ENSYS	TOTAL PCBs 8080	REMARKS	AREA	EXCAV.
43	PS-09-01	11/2/95	1435	<2			-	-
	PS-09-01D	11/2/95	1435	<2		DUP OF PS-09-01	-	-
44	PS-11-01	11/2/95	1540	>2-<50			-	-
	PS-11-01D	11/2/95	1540	>2-<50		DUP OF PS-11-01	-	-
45	PS-13A-05	3/14/96	1540	<2			-	-
	PS-13A-05D	3/14/96	1540	<2		DUP OF PS-13-05	-	-
46	PS-15-00	11/10/95	1055	>2-<50	0.75	TOP OF PS-15-01	-	-
	PS-15-00D	11/10/95	1055	>2-<50		DUP OF PS-15-00	-	-
47	PS-15B-055	3/25/96	1035	<2			-	-
	PS-15B-055D	3/25/96	1035	<2		DUP OF PS-15B-055	-	-
48	PS-17-01	11/3/95	1035	<2			-	-
	PS-17-01D	11/3/95	1035	<2		DUP OF PS-17-01	-	-
49	PS-19-02	1/3/96	1555	>2-<50			-	-
	PS-19-02D	1/3/96	1555	>2-<50		DUP OF PS-19-02	-	-
50	PS-19A-06	3/20/96	1440	<2			-	-
	PS-19A-06D	3/20/96	1440	<2		DUP OF PS-19A-06	-	-
51	PS-22A-05	3/14/96	1248	<2			-	-
	PS-22A-05D	3/14/96	1248	<2		DUP OF PS-22A-05	-	-
52	SP-22-01L	1/4/96	0835	<2			-	-
	SP-22-01LD	1/4/96	0835	<2		DUP OF SP-22-01L	-	-
53	AP-2B-01	1/5/96	0842	>2-<50			-	-
	AP-2B-01D	1/5/96	0842	>2-<50		DUP OF AP-2B-01	-	-
54	AP-09-01	1/30/96	1330	<2			-	-
	AP-09-01D	1/30/96	1330	<2		DUP OF AP-09-01	-	-
55	AP-33-01	2/6/96	0936	>2-<50			-	-
	AP-33-01D	2/6/96	0936	>2-<50		DUP OF AP-33-01	-	-
56	EO-B0-01	2/27/96	1030	<2			-	-
	EO-E1-01	2/27/96	1030	<2		DUP OF EO-B0-01	-	-
57	EO-C1-02	3/7/96	0855	<2			-	-
	EO-E1-02	3/7/96	0855	<2		DUP OF EO-C1-02	-	-

* - CLOSE TO 2 PPM

** - CLOSE TO 50 PPM

U - UNDETECTED

SHADED CELL INDICATES DUPLICATES DID NOT CORRELATE.



7.0 COSTS

7.1 Costs to Date

Table 7-1 presents an approximate summary of costs spent by Witco on remedial activities to date. The estimated costs shown include costs to complete such work as excavation, drum removal, hazardous and non-hazardous waste disposal, sampling, demolition, backfilling, site restoration, etc., and administration work associated with these activities.

7.2 Estimated Future Costs

Table 7-2 presents an estimate of future costs associated with remaining remedial activities. As can be seen in the table, remedial tasks not yet completed include the remediation of the heater pad area, preparation of a Classification Exception Area submittal, groundwater monitoring, and a Declaration of Environmental Restriction submittal.

A range is given for the estimated cost associated with groundwater monitoring as this portion of the work has not yet been scoped out. The range given presents a rough estimate of costs associated with an assumed monitoring time frame of five years. The low end of the range assumes a cost of \$6,000 per year for five years, while the high end assumes a cost of \$16,000 per year for 5 years.

TABLE 7-1

**COSTS TO DATE SUMMARY TABLE
WITCO CORPORATION
PERTH AMBOY FACILITY**

YEAR	APPROXIMATE YEAR END COST	APPROXIMATE CUMULATIVE COST
1993	\$35,500	\$35,500
1994	\$139,300	\$174,800
1995	\$2,030,200	\$2,205,000
1996	\$4,347,200	\$6,552,200
1997	\$897,700	\$7,449,900

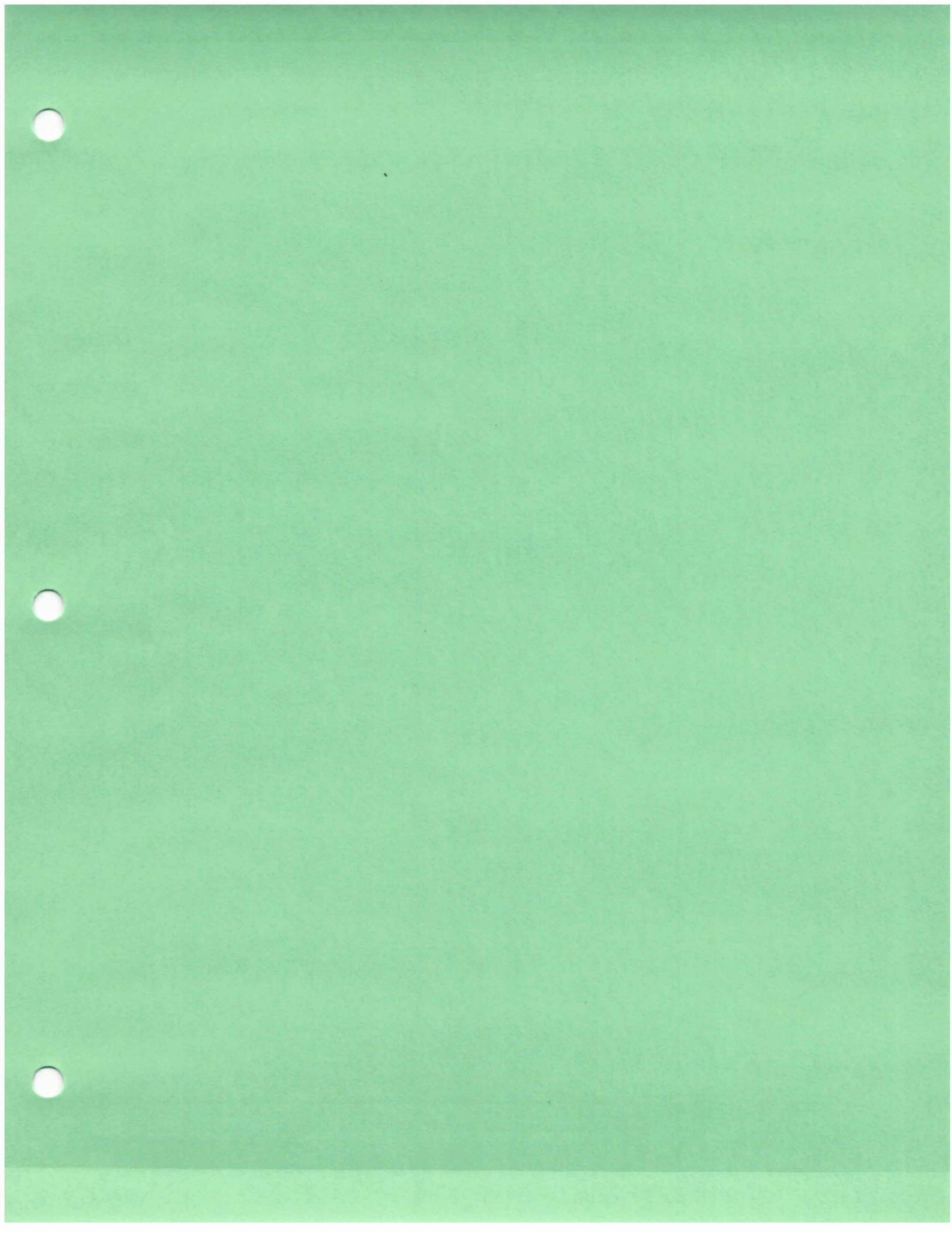
TABLE 7-2

**ESTIMATED FUTURE COSTS SUMMARY TABLE
WITCO CORPORATION
PERTH AMBOY FACILITY**

REMEDIAL ACTIVITY	ESTIMATED COST
Remedial Action Report	\$18,000
Heater Pad Remediation	\$160,000
Remedial Action Report Addendum Including: Classification Exception Area (CEA) Declaration of Environmental Restriction (DER)	\$42,000
Groundwater Monitoring	\$30,000* - \$80,000**
TOTAL	\$250,000 - \$300,000

* Assumes a cost of \$6,000 per year for 5 years.

** Assumes a cost of \$16,000 per year for 5 years.



8.0 PROPOSED REMEDIAL ACTIONS

8.1 Results of Remedial Actions

8.1.1 Soils and Sediments

With the completion of the remedial action, review of the analytical data and as-built drawings confirmed that the remedial objectives were attained. Review of the excavation limits and the post-excavation sampling locations demonstrated that the excavations were in accordance with the areal extent of soils to be remediated as described in the RAW. Evaluation of the data generated by the post-excavation sampling indicated that cleanup goals had been reached within each of the individual excavations.

8.1.2 Buried Drums and Metal Objects

The test pit and subsequent drum retrieval programs were successful in removing improperly disposed of materials encountered during the program. The cause of the geophysical anomaly was determined in all but seven of the test pits (these seven were excavated to natural soil without encountering the cause of the anomaly). Most anomalies resulted from the presence of construction debris, which was removed and disposed of prior to backfilling the test pit.

The test pit program led to the discovery of buried drums in several of the test pits. A buried drum retrieval program was instituted at the Facility and led to the removal of 729 drums. An excavated drum inventory is provided in Appendix E. These actions were successful in meeting the remedial objectives of removing from the ground any improperly disposed of materials that were uncovered during remedial activities.

8.1.3 Restoration

The final phase of the remediation of the Facility was restoration. The remediated areas were restored to pre-remedial conditions, with consideration of the original topography, hydrology and vegetation. The backfilling and capping of remediated areas were completed with on-site material to the greatest extent possible. The existing stockpiles of soil, sediment and concrete were tested for PCBs and other parameters (when necessary) to determine if appropriate for use as backfill and cover. The remediated areas were backfilled and graded to provide adequate drainage. Other measures, such as the installation of a storm sewer along Amboy Avenue, were also taken to provide for the appropriate drainage of the site. The remediated areas were then covered with gravel or seeded in accordance with the erosion and sedimentation control plan to complete the restoration activities.

8.2 Proposed Actions

Additional remedial work is required in order to meet the remedial objectives as defined in the RAW. Only source remaining to be addressed is soils underlying the heater pad foundation. Upon successful completion of the remediation and restoration of the heater pad area, all source removal

will be completed. For any areas where residential soil standards have not been achieved, a Declaration of Environmental Restriction (DER) will be submitted. Since sources have been removed, groundwater constituent concentrations are low proximal to standards and declining, and it appears that contaminants are not migrating off-site to potential environmental receptors, groundwater will be addressed through natural remediation. In addition, a Classification Exception Area (CEA) will need to be established for the contaminated groundwater until such time when the groundwater quality standards are achieved.

An Addendum to this report will be prepared and submitted at a later date when the above mentioned remedial activities have been completed. The Addendum will include the following:

- Summary of remedial activities completed in the heater pad area as per the Heater Pad Remedial Action Work Plan (Appendix G);
- Completed Declaration of Environmental Restriction;
- Natural Groundwater Remediation Section; and
- Established Classification Exception Area.

8.3 Recommendations

8.3.1 Heater Pad Remediation

As mentioned above, remediation of the heater pad area is necessary in order to achieve remedial objectives. Elevated levels of PCBs have been detected in the soils underlying this area, AOC D-2. This area could not be remediated previously because the heaters on the pad were still in use. The Facility now has a new boiler which allowed the five old heaters to be removed from service. These heaters have since been decommissioned and disposed. Remedial action in the heater pad area will include excavation and closure of the remaining heater pads. It will include the demolition of the concrete pads (and related curbs), the excavation of contaminated soil to the maximum depth practicable, placement of a PVC liner, the placement and compaction of certified clean fill, and the construction of new concrete slabs. The Heater Pad Remedial Action Work Plan prepared by Foster Wheeler Environmental in May of 1998 is included in this report as Appendix G.

8.3.2 Natural Attenuation Proposal

8.3.2.1 Criteria and Applicability

Witco is proposing a natural groundwater remediation at the Perth Amboy Facility. A number of factors, such as the degradability of the specific contaminants found, the decreasing contaminant trends, no apparent off-site migration of contaminants and a reducing environment (wetlands are present on the downgradient side of Facility), indicate that the Facility's groundwater is ideally suitable for natural remediation. Witco believes, based on current data, that criteria necessary for a natural groundwater remediation can be met. This section has been written to satisfy the requirements of the Technical Requirements for Site Remediation, Specific remedial action requirements, for a natural groundwater remediation, 7:26E-6.3(d).

The following are the ten items that must be demonstrated to the NJDEP for a natural groundwater remediation. These items are taken directly from 7:26E-6.3(d).

1. *Groundwater contaminant concentrations will decrease to applicable Groundwater Quality Standards (N.J.A.C. 7:9-6) through degradation, retardation or dispersion under present site conditions.*

Groundwater contaminant concentrations have steadily decreased throughout the four years of the groundwater monitoring program. Section 5.0 Groundwater Contamination presents the groundwater data for this period. Contaminant trends are presented on Figures 5-4 through 5-11.

Further investigation will be performed to determine future contaminant degradation, retardation and dispersion.

Additional items, required by the NJDEP, to be evaluated to determine the viability of natural remediation, in regards to Item 1 are:

- (1) *Contaminant mass, as determined by free or residual product and dissolved phase delineation and dissolved contaminant concentrations;*

Four rounds of analytical data for the Facility's groundwater exists. This data will be used in evaluating the contaminant mass. The dissolved phase data will be used. No product has been observed in the Facility's monitoring wells.

- (2) *Dissolved oxygen content of groundwater;*

The dissolved oxygen (DO) content of the groundwater at the Facility will be measured in all monitoring wells, during groundwater sampling, which will occur in January 1999. In all future rounds of the groundwater monitoring program. DO data will also be collected.

- (3) *Presence or absence of microorganisms in soil and groundwater;*

Data will be collected to support the presence of microbial degradation processes at the Facility. The list of proposed analyses to investigate this activity is presented in Item (5).

- (4) *Groundwater flow velocity;*

Groundwater flow velocity will be calculated based on hydrological data acquired during the LMS RI/FS.

- (5) *Applicable physical and chemical characteristics of contaminants and contaminant degradation products present in both soil and groundwater.*

Additional analyses will be added to the next two rounds of groundwater sampling to assess natural attenuation factors. The list of analyses below will be added to the proposed groundwater

monitoring program, which is presented in Section 8.3.2.2. The initial set of these additional parameters will be collected during the upcoming January 1999 round. Another round of these parameters will be collected in the subsequent June 1999 round. These parameters will be collected from the wells listed in Section 8.3.2.2. This selection of wells is based on the presence of organic exceedances in wells screened in the Woodbridge member.

The additional parameters to be analyzed are:

Dissolved Oxygen	Alkalinity
Oxidation-Reduction Potential	Nitrate
Methane	Sulfate
Hydrogen	Chloride
Ethylene	Ferrous Iron
Ethane	Dissolved Total Organic Carbon

Results of the additional natural attenuation sampling will be presented in the RAR Addendum.

The sorptive and desorptive characteristics along with other applicable physical and chemical characteristics of the soil will not be evaluated at the present time. There appears to be sufficient information in existence or will be gathered based on the above items, such that this evaluation is not necessary.

2. *Free and/or residual product in the unsaturated zones, as determined pursuant to N.J.A.C. 7:26E-2.1(a)11, is treated or removed, if practicable, or contained if treatment or removal are not practicable;*

Currently there does not appear to be any areas at the Facility with free and/or residual product in the unsaturated zone. The drum removal effort and the various soil remediations have removed likely sources of product. This item, therefore is not applicable.

3. *All soil contamination in the unsaturated zone has been or will be remediated to the applicable numeric soil remediation standard in accordance with a schedule approved by the Department;*

A large scale site-wide soil remediation has been completed. Section 4.0 documents the various tasks associated with the remediation. Post excavation samples from the different areas of concern have been collected and analyzed. These sample results can be found in the tables accompanying Section 4.0. Results from these samples indicate that cleanup standards have been achieved.

4. *Groundwater contamination has been delineated to the standard applicable to the nearest downgradient receptor, either the Ground Water Quality Standards, N.J.A.C. 7:9-6, or the more stringent of either the State Surface Water Quality Standard Criteria, N.J.A.C. 7:9B, or the Federal Surface Water Quality Criteria, 40 C.F.R. Part 131, or other applicable standards;*

The delineation of the groundwater contaminants is based on the four years of data acquired during the groundwater quality monitoring program. Figure 5-2 presents the compounds above standards. It does not appear contamination is migrating off-site. Further information regarding potential downgradient receptors will be evaluated and presented in the Natural Groundwater Remediation section of the RAR Addendum.

5. *Ground water contaminated above the applicable standard will not reach the nearest downgradient receptor, as estimated by an appropriate ground water flow/contaminant transport model selected pursuant to N.J.A.C. 7:26E-4.4(h)3iv;*

An appropriate analytical groundwater flow/contaminant transport model based on Section III.C. of the Final Guidance On Designation of Classification Exception Areas (NJDEP April 1995) will be formulated. The selection of the model will be according to requirements in 7:26E-4.4(h)3iv. Results of the modeling effort will be presented in the RAR Addendum. The model will be used to assess contaminant migration to potential downgradient receptors.

6. *The fate of the contaminant plume has been documented pursuant to N.J.A.C. 7:26E-6E-6.2(a)17;*

The fate of the contaminants migration will be documented according to N.J.A.C. 7:26E-6.2(a) 17 in the Natural Groundwater Remediation section of the RAR Addendum.

7. *Contaminant levels in ground water do not present a vapor risk to any receptors. This determination shall be made on a case-by-case basis;*

It does not appear at this time that a vapor risk to any receptors exists. It also does not appear that contaminants are migrating off-site based on the surface water sampling data and downgradient well (MW-12S and MW-13S) data. In addition, the levels of VOC contaminants in the Facility's groundwater is generally in the tens to hundreds of micrograms per liter, which ordinarily does not present much of a vapor risk. Further information on vapor risks to receptors will be provided in the Natural Groundwater Remediation section of the RAR Addendum.

8. *Predicted impacts to potential receptors are consistent with the current and potential ground water uses based on a 25-year planning horizon as projected by local and county land use documents. This shall include, without limitation information pertaining to the existence of water lines, proposed future installation of water lines, local and/or county ordinances restricting installation of potable wells;*

This information regarding planning horizons will be sought from local authorities and will be included in the RAR Addendum.

9. *All necessary access agreements needed to monitor the ground water quality have been obtained; and*

At this time it does not appear that any access agreements will be needed. It is anticipated that only on-site wells will be required to be monitored, since there does not appear to be off-site migration of groundwater contaminants.

10. *If a Classification Exception Area needs to be established, the person responsible for conducting the remediation has provided the Department all necessary information in accordance with N.J.A.C. 7:26E-6.2(a)17.*

A CEA will be established for the site. At this time (establishment of the CEA), Witco will provide the notifications required as part of this process.

8.3.2.2 Monitoring Requirements

Further NJDEP requirements for natural remediation, regarding groundwater monitoring, as detailed in 7:26E-6.3(e) are listed below.

1. *A ground water monitoring program shall be implemented to monitor plume characteristics and movement to calibrate the model used to estimate the eventual extent of the plume, and to assess the effectiveness of the natural ground water remediation. This program shall consist of the following:*
 - i. *Sampling shall be conducted on a quarterly basis at monitoring wells associated with the natural remediation, for a minimum of eight quarters, including:*
 - (1) *At least one area of concern monitoring well located at the source area to monitor plume conditions at the source area;*
 - (2) *At least one plume sampling point located downgradient of the source area but within the contaminant plume except as provided in (e)II(3) below;*
 - (3) *At least one plume fringe monitoring well located at the limit of the plume, as determined pursuant to (d)4 above. Depending on the areal extent of the contaminant plume, the Department may determine that one monitoring well may satisfy the requirements of both (e)II(2) above and this subparagraph; and*
 - (4) *At least one downgradient sentinel well located beyond the zone delineated pursuant to (d)4 above. Contaminant levels in this sentinel well shall remain below the applicable standard. The sentinel well shall be located no closer than three years travel time to the nearest potential downgradient receptor and no further than five years travel time from the delineated downgradient extent of the contaminant plume;*

The following outlines the proposed groundwater monitoring program for natural attenuation:

Four rounds of groundwater quality monitoring data covering a four year period already has been acquired for the Facility. A quarterly sampling program for eight quarters (or two years) does not

seem necessary, since the four years of data exist. Therefore, it is proposed to continue the annual groundwater sampling for four more years (or for four more rounds of sampling). After the four year period eight rounds of data will exist. At this point the data can be evaluated and the progress of the remediation determined. If it appears that contaminant concentrations will decrease to below GWQS before this time a modification to the program will be presented to the NJDEP.

The following are the proposed monitoring well designations for the groundwater monitoring program:

1. Areas of Localized Exceedance Monitoring Wells
2. Sentinel Monitoring Wells
3. Sentinel Surface Water Sampling Location
4. Fringe Monitoring Wells
5. Upgradient Monitoring Well

Six to eight wells will be selected, from the current monitoring well network, for the above designations. The selection of the wells will be based on modelling efforts. A specific list of organic compounds, which have been found above GWQS or SSGWQS in the Facility's groundwater, will be analyzed for. This list will be presented along with the modelling results in the Natural Groundwater Remediation section of the RAR Addendum. Field measured parameters will be collected during future groundwater sampling events. The parameters will include DO, pH, oxidation-reduction potential, temperature and specific conductivity.

2. A Classification Exception Area shall be established for the area of the aquifer impacted by the migrating contaminant plume, pursuant to N.J.A.C. 7:26E-6.1(g) and 6.2(a)17;

A CEA will be established for the site. Section 8.3.3 describes the details of the CEA documentation.

Item 3 of 7:26E-6.3(e) describes data usage. Information pertaining to this item will be presented in the Natural Groundwater Remediation section of the RAR Addendum that will be submitted following the Heater Pad Remediation.

8.3.3 Classification Exception Area

A Classification Exception Area (CEA) will be established at the Witco Perth Amboy Facility. A CEA essentially provides notice that constituents within a given aquifer do not meet the Ground Water Quality Standards (GWQS), N.J.A.C. 7:9-6, in a localized area. The CEA is required as part of an approved remedy whenever GWQS are exceeded by constituents in site groundwater. The CEA documentation consists of a detailed written description, as well as maps and drawings displaying elements of the CEA. There are three basic sections to a CEA:

1. Boundaries
2. Contaminants
3. Longevity

The following addresses each of these sections.

Boundaries

The area effected by the CEA will be sufficiently documented. This documentation will consist of a written part that will detail relevant features of the Facility as well as the immediately surrounding area. Included in this will be a section on future land usage, surrounding land use and the presence or absence of receptors. Another aspect of the CEA boundary documentation will be the submitted maps and drawings showing the identified features and the extent of the area exceeding groundwater quality standards.

The degree of documentation required for the CEA boundaries' section depends on whether the site is in an area of groundwater usage and whether contaminants are migrating off-site. Groundwater usage in the vicinity of the Facility will be investigated. Assuming the Facility is in a non-groundwater use area and there appears to be no off-site migration of groundwater contamination, the following information will be included:

- The latitude and longitude along with the lot and block numbers of the Facility;
- Identification of all roads, streams and other natural and manmade borders of the Facility;
- Mapping of the contaminant extent on a USGS 7.5 minute quadrangle map; and
- The geologic formation effected.

If it is determined that there is nearby groundwater usage, then the level of documentation will be increased accordingly.

Contaminants

Groundwater contaminants in excess of GWQS found at the Facility, for which the exception applies, will be identified in this section.

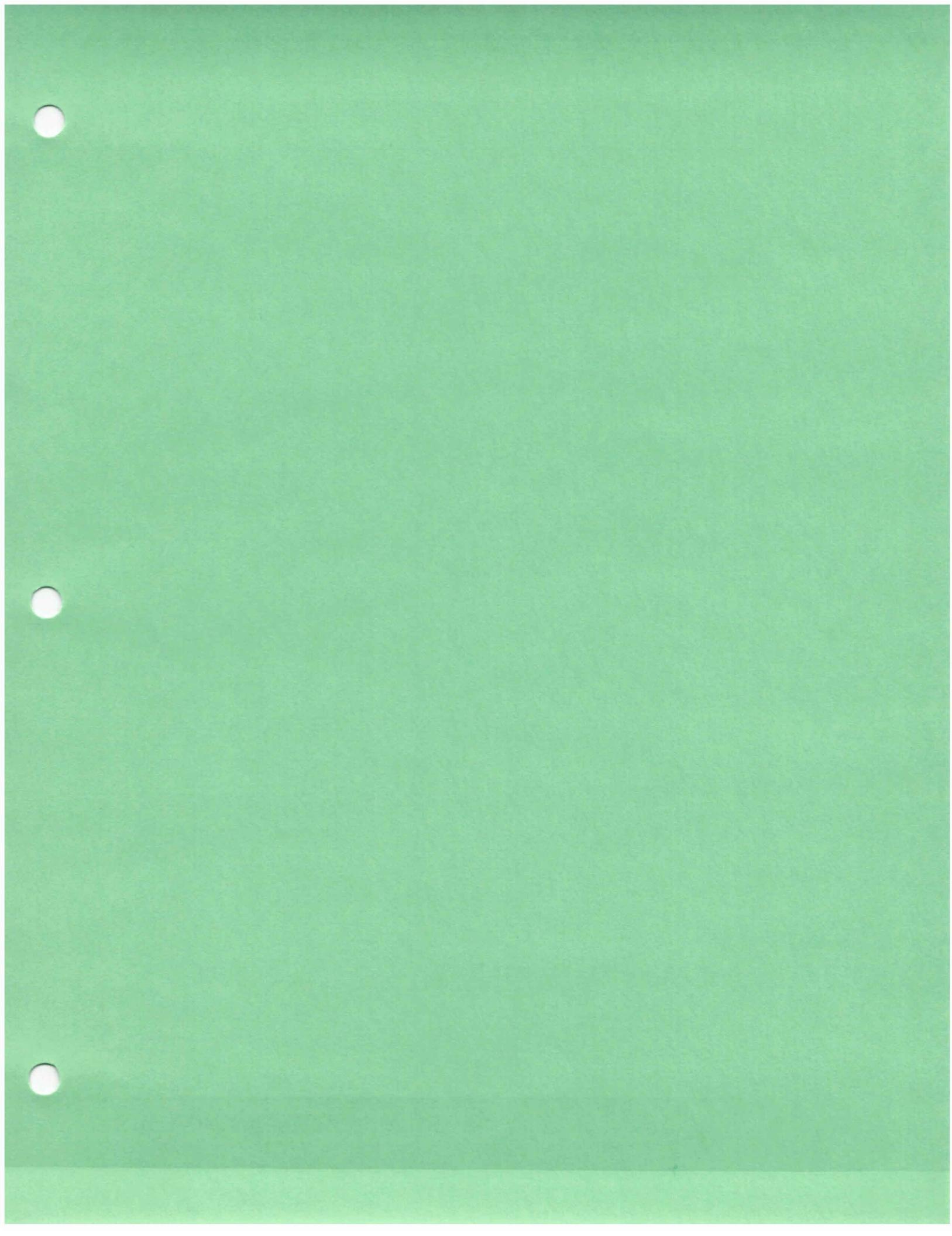
Longevity

A CEA is in effect for a specified period of time, which is usually based on the amount of time it is estimated to reduce contaminant levels within the aquifer to below GWQS. This section will identify the length of time that the CEA will be in effect. The length of the CEA will be determined based on the time required for natural attenuation to reduce site contaminant concentrations to below groundwater quality standards. This time is based on modeling efforts and degradation analysis.

Two other key aspects to a CEA are:

1. Public Notice Requirements; and
2. Monitoring Requirements.

Each of these topics is discussed below:



Public Notification Requirements

The requisite extent of public notification depends on the current and projected groundwater use in the area. The current and future use of groundwater in the area will be researched. State and local agencies will be contacted as well regional and local water purveyors to gather information on groundwater usage.

Once all required groundwater usage data is accumulated and the CEA is established all appropriate authorities, both local and state, will be notified.

Documentation will be provided showing that all the appropriate external agencies have been notified of the CEA.

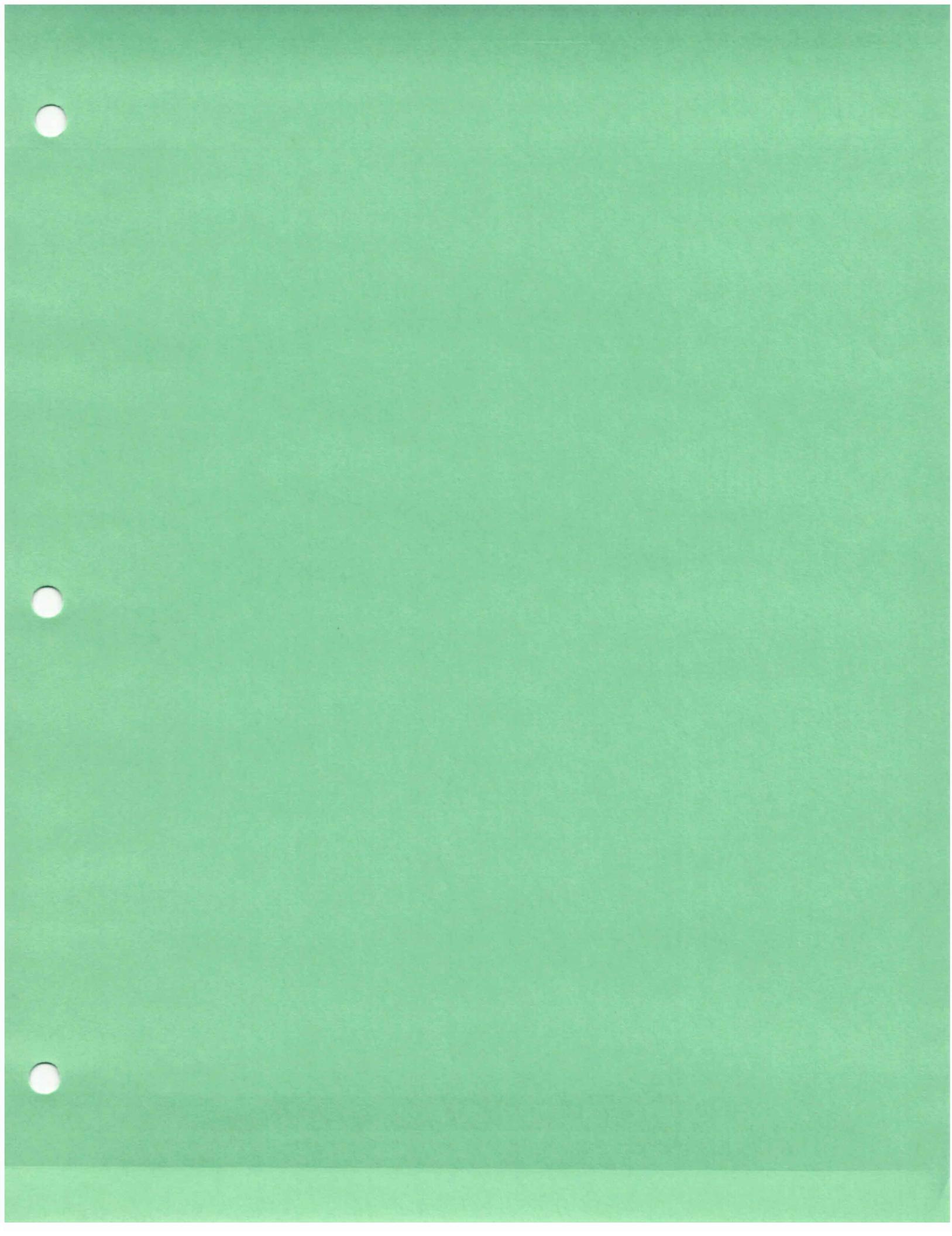
Monitoring Requirements

The CEA will present the required groundwater monitoring program elements. Currently an approved monitoring program exists at the site. This program has been active for four years. A modified groundwater monitoring program is proposed and presented in Section 8.3.2.2. In addition, a number of additional analyses (see Section 8.3.2.1), required to demonstrate that natural attenuation of groundwater contaminants is occurring, will be included in the next two rounds of sampling (1/99 and 6/99).

The formal CEA will be presented in the RAR Addendum that will be submitted to the NJDEP upon completion of the Heater Pad Area Remediation.

8.3.4 Declaration of Environmental Restriction

A DER will be prepared and submitted upon completion of the remedial work in the heater pad area. Soils with contamination exceeding NJDEP Soil Cleanup Criteria for Residential Direct Contact will be delineated and included on a site plan of the Facility. These areas will then be included in the DER. An example of the DER format that will be used is included in Appendix H.



9.0 REFERENCE LIST

Foster Wheeler Environmental Corporation, *Heater Pad Remedial Action Work Plan, Witco Perth Amboy Facility*, May 1998.

Foster Wheeler Environmental Corporation, *Groundwater Monitoring Program Annual Sampling Report for Witco Corporation, Perth Amboy, New Jersey*, September 15, 1995.

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Foster Wheeler Environmental Services Division, *Remedial Action Work Plan, Witco Corporation, Perth Amboy, NJ Facility*, July 1994.

Lawler, Matusky & Skelly Engineers (LMS), *Task 2 - Phase, Phase II Sampling Report: Witco Corporation, Perth Amboy, New Jersey, Remedial Investigation/Feasibility Study*, September 1991.

